U.S. Department of Energy
Office of River Protection
P.O. Box 450, MSIN H6-60
Richland, Washington 99352

JUN 15 2011

11-ESQ-134

Ms. Jane A. Hedges, Program Manager
Nuclear Waste Program
Washington State
Department of Ecology
3100 Port of Benton Blvd.
Richland, Washington 99354

Dear Ms. Hedges:

SUBMITTAL OF THE HANFORD SITEWIDE DANGEROUS WASTE PERMIT, PERMIT NUMBER: WA7890008967, REVISION 9, DRAFT FOR OPERATING UNIT 12, DOUBLE-SHELL TANK (DST) SYSTEM AND 204 AR, SUPPLEMENTAL INFORMATION FOR AMERICAN RECOVERY AND REINVESTMENT ACT (ARRA) PROJECT RA-1.7-1, REFURBISH ENRAFS PROJECT

ARRA Project RA-1.7-1 is being conducted by the U.S. Department of Energy (DOE), Office of River Protection (ORP), and Washington River Protection Solutions LLC (WRPS), to provide installation of new Enraf™ gauges in the annulus area for leak detection of three DST Farms. Enraf™ buoyancy type leak detectors are used to detect leaks in the annular space of DSTs by means of a plummet attached to a cable. Since 1999, Enraf™ gauges have been used for DST leak detection in the SY DST Farm. Enraf™ gauges have been used in AY and the AZ DST Farms since early 2004. The scope of Project RA-1.7-1 was to install Enraf™ gauges in the annulus of the remaining tanks in AP, AW, and AN Farms. Project RA-1.7-1 will be completed in May 2011. All DST annulus leak detection is being provided by Enraf™ gauges.

The ORP and WRPS have worked with the Washington State Department of Ecology (Ecology) from the start of the ARRA Projects regarding installation of the Enraf™. On March 3, 2010, meetings specific to the Enraf™ installations were initiated, along with subsequent field walk downs, to address Ecology concerns and issues on the project.

The ORP and WRPS recognize the importance of the Enraf™ level sensing devices in providing information that allows for safe operation of the tanks. WRPS has taken steps to verify proper installation of all Enraf™ devices for this project. In addition, we believe the Enraf™ devices will assist us in better complying with the requirements of the SY Settlement Agreement.

The information in Attachment 1, "Revisions to the Draft Hanford Site Dangerous Waste Permit, Permit Number: WA7890008967, Revision 9, Operating Unit 12, Double Shell Tank System and 204 AR," is intended to identify appropriate changes in the draft DST permit to reflect the Enraf™ devices in use at AP, AW, and AN Tank Farms. Attachment 2, "Information Provided to Respond to Ecology Email Comments on January 20, 2011," is intended to provide

information requested by Ecology to support the permit changes identified in Attachment 1 including: responses to Ecology's comments on Engineering Change Notice 726946, "AP Tank Farm Annulus Enraf™ Installation," applicable work instructions and work records, the National Electrical Code Inspection Report, and Enraf™ operation and maintenance procedures. ECN-726946, which describes in detail the type of work performed by this project, was also provided to Ecology in April 2010 for review. Item 1 of Attachment 2 responds to Ecology's review comments on this document.

Submittal of the changes to the draft Permit provided in Attachment 1 does not constitute, and should not be construed as an approval of draft DST Permit content that Ecology intends to submit for public review under Revision 9 to the Hanford Sitewide Permit. The ORP and WRPS look forward to continuing to provide feedback on the latest version of DST permit conditions. The DOE is reserving its right to review and propose changes to the draft DST permit conditions.

These attachments and the proposed draft permit changes were reviewed by Ms. M. L. Hendrickson and Ms. K. J. Wold-Fineberg of your staff on May 4, 2011, and May 9, 2011. Comments were resolved on the draft permit changes by Ecology, ORP, and WRPS.

If you have any questions, please contact me, or your staff may contact Lori A. Huffman, Director, Environmental Compliance Division, (509) 376-0104, or J. W. Donnelly, WRPS, (509) 373-2119.

Sincerely,

Scott L. Samuelson, Manager
Office of River Protection

Charles G. Spencer
President and Project Manager
Washington River Protection Solutions LLC

ESQ:GMN

Attachments: (2)

cc: See page 3

cc w/attachs:
M. L. Hendrickson, Ecology
J. J. Lyon, Ecology
R. R. Skinnarland, Ecology
C. L. Whalen, Ecology
K. F. Wold-Fineberg, Ecology
W. T. Dixon, WRPS
J. W. Donnelly, WRPS
J. E. Geary, WRPS
R. E. Gregory, WRPS
G. J. Johnson, WRPS
F. R. Miera, WRPS
B. D. Peck, WRPS
L. L. Penn, WRPS
D. Scott, WRPS
R. J. Skwarek, WRPS
C. L. Slack, WRPS
J. A. Voogd, WRPS
TPA Administrative Record (S-2-4)
Environmental Portal, LMSI
WRPS Correspondence

Attachment 1
11-ESQ-134
(7 Pages)

Revision to the Draft Hanford Site Dangerous Waste Permit, Permit Number WA7890008967, Revision 9, Operating Unit 12, Double-Shell Tank System and 204 AR

Revisions to the draft Hanford Site-Wide Dangerous Waste Permit
Number WA7890008967, Revision 9, (to support ARRA Project 1.7.0)

Part III, Operating Unit 12
Double Shell Tank System and 204 AR

Draft Permit Change Index

Unit	Double Shell Tank System
Draft Permit Part	Part III, Operating Unit 12
Section	Addendum C, Section C.1
Description of Change	Change is made to this section to reflect Enraf probes being used for primary tank leak detection in AN farm.

C.1 Leak Detection for 241-AN Tanks Farm - Primary and Secondary Containment Structures,

The 241-AN Tank Farm DST Waste Storage System includes three types of leak detection, as follows:

- Primary tank leakage: ~~Detected by conductivity probes~~Enraf[1] monitoring in annulus
- Primary tank leakage: Enraf[1] level gauges that measure primary tank waste level changes
- Primary tank leakage: Manual Gauge
- Pit leak detection: Detected by conductivity probe located near the pit floors

In addition to installed leak detection equipment, administrative/operational controls can be used to detect leaks during transfers. These controls include Health Physics Technician (HPT) monitoring and maintaining material balances.

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1. [1] Enraf is a trademark of Enraf, Inc., Houston, TX

Unit	Double Shell Tank System
Draft Permit Part	Part III, Operating Unit 12
Section	Addendum C, Section C.1.1
Description of Change	Change is made to this section to reflect Enraf probes being used for primary tank leak detection in AN farm.

C.1.1 Primary Tank Leak Detection – Annulus Conductivity Probe

The primary tank leak detection in 241-AN Tank Farms consists of three equally spaced Enrafs installed in the annulus and designed to detect the presence of liquid in the annulus. The Enraf Gauges are monitored by the Tank Monitor and Control System (TMACS).

~~The primary tank leak detector probes (three per tank), which sense the liquid level in the annulus, consist of a single probe element, 1/4 in. in diameter by 3 ft in length, with a conductivity-sensing metal rod attached to a metal tape with hose clamps. The sensing circuit is the metal tape/rod to the grounded tank, which completes the circuit once the rod contacts the waste. The probe is suspended from a Flake[2] box or Flake reel housing by its own conductor cable mounted on an annulus riser flange. The primary tank leak detector is the same configuration as the Flake tank level gauge. The cable is a combination measuring tape and circuit wire cable (cable/tape). The cable/tape is wound manually onto the reel to raise and lower the probe to the proper height above the annulus floor. Rotating contacts on the reel mate with the spring-loaded stationary contacts on the reel housing to maintain circuit continuity with the probe. The approximately 9 V (dc) circuit is continued from the terminal box on the reel housing through buried cable directly to a relay panel in the 241-AN-271 Instrument Control Building. The relays are connected through another set of circuits to the annunciators on the main panel, where alarm activation and annunciation occurs. If a conductivity probe senses liquid in the annulus, a signal is transmitted through the relay contacts to the 241-AN-271 Instrument Control Building instrumentation panel, activating annunciators ANN-101-4 through ANN-107-4 (depending on location) and energizing the instrumentation panel alarm horn.~~

~~For the key arrangement, piping and, instrumentation diagrams related to primary tank leak detection, using conductivity probes, in the annulus at the 241-AN Tank Farm see drawing H-14-010501, Sheets 1 through 7.~~

~~For the risers location related to primary tank leak detection, using conductivity probes, in the annulus at the 241-AN Tank Farm located in risers 059, 060, & 061 see drawing H-14-010501, Sheets 1 through 7.~~

~~2. [2] Flake boxes were developed years ago at the Hanford Site by John Flake. There is no patent or trademark.~~

Unit	Double Shell Tank System
Draft Permit Part	Part III, Operating Unit 12
Section	Addendum C, Section C.2
Description of Change	Change is made to this section to reflect Enraf probes being used for primary tank leak detection in AP farm and make the C.2 section heading consistent with other section headings in Addendum C.

C.2 ~~The~~ Leak Detection for 241-AP Tank Farm ~~DST Waste Storage System includes three types of leak detection, as follows~~Primary and Secondary Containment Structures:

The 241-AP Tank Farm DST Waste Storage System includes three types of leak detection, as follows:

- Primary tank leakage: ~~Detected by conductivity probes~~Enraf monitoring in annulus
- Primary tank leakage: Enraf Level Monitor
- Primary tank leakage: Manual Gauge
- Pit leakage (into) during process water transfers: Detected by conductivity probe leak detectors in pits

Only the Leak-Detection System in the leak-detection pit is part of the Waste Storage System. Pipe-encasement leak detection and leak detection in the central pump pit, transfer pump pit, and drain pit is considered part of the Waste Transfer System and is not included in this section. Leak detection in the annulus pump pit is considered part of the EAPS and is not included in this section.

In addition to installed leak detection equipment, administrative/operational controls can be used to detect leaks during transfers. These controls include Health Physics Technician (HPT) monitoring and maintaining material balances.

Unit	Double Shell Tank System
Draft Permit Part	Part III, Operating Unit 12
Section	Addendum C, Section C.2.1
Description of Change	Change is made to this section to reflect Enraf probes being used for primary tank leak detection in AP farm.

C.2.1 Primary Tank Leak Detection – Enraf Monitoring in Annulus ~~Conductivity Probe~~

The primary tank leak detection in 241-AP Tank Farms consists of three equally spaced Enrafs installed in the annulus and designed to detect the presence of liquid in the annulus. The Enraf Gauges are monitored by the TMACS.

~~The primary tank leak detector probes (three per tank), which sense the liquid level in the annulus, consist of a single probe element, 3/8 in. in diameter by 3 ft in length. The probe is suspended from a Flake[3] Box or Flake reel housing mounted on an annulus riser flange. The tape is manually wound onto the reel to raise and lower the probe to the proper height above the annulus floor. Rotating contacts on the reel will mate with spring-loaded stationary contacts on the reel housing to maintain circuit continuity with the probe. The 9.0 V (dc) circuit is continued from the terminal box on the reel housing, through buried cable, directly to the instrument panel in the 241-AP-271 Instrument Control Building, where alarm activation and annunciation occurs. If a conductivity probe senses liquid in the annulus, it will complete the circuit to ground; then a signal is transmitted to the 241-AP-271 Instrument Control Building instrumentation panel, activating annunciators ANN-101-4 through ANN-108-4 (depending on location) and energizing the instrumentation panel alarm horn.~~

~~3. [3] Flake boxes were developed years ago at the Hanford Site by John Flake. There is no patent or trademark.~~

Unit	Double Shell Tank System
Draft Permit Part	Part III, Operating Unit 12
Section	Addendum C, Section C.3
Description of Change	Change is made to this section to reflect Enraf probes being used for primary tank leak detection in AW farm.

C.3 Leak Detection for 241-AW Tank Farm Primary and Secondary Containment Structures

The 241-AW Tank Farm DST Waste Storage System includes three types of leak detection, as follows:

- Primary tank leakage: ~~Detected by conductivity probes~~Enraf monitoring in annulus
- Primary tank leakage: Enraf Level Monitor
- Primary tank leakage: Manual Gauge
- Pit leakage (into) during process water transfers: Detected by conductivity probe leak detectors in pits

Drawings H-14-010502, Sheets 1 through 6 relates the positioning of the primary and annulus tank monitoring equipment respectively.

In addition to installed leak detection equipment, administrative/operational controls can be used to detect leaks during transfers. These controls include Health Physics Technician (HPT) monitoring and maintaining material balances.

Unit	Double Shell Tank System
Draft Permit Part	Part III, Operating Unit 12
Section	Addendum C, Section C.3.1
Description of Change	Change is made to this section to reflect Enraf probes being used for primary tank leak detection in AW farm.

C.3.1 Primary Tank Leak Detection—Enraf Monitoring in Annulus ~~Conductivity Probe~~

The primary tank leak detection in 241-AW Tank Farms consists of three equally spaced Enrafs installed in the annulus and designed to detect the presence of liquid in the annulus. The Enraf Gauges are monitored by the TMACS.

~~The primary tank leak detector probes (three per tank), which sense the liquid level in the annulus, consist of a single probe element, 3/8 in. in diameter by 3 ft in length, with two conductivity sensing elements built into the tip of the probe. The probe is suspended from a Flake[4] tank or Flake reel housing by its own conductor cable mounted on an annulus riser flange. The cable is a combination measuring tape and multi-conductor cable (cable/tape). The cable/tape is manually wound onto the reel to raise and lower the probe to the proper height above the annulus floor. Rotating contacts on the reel mate with spring-loaded stationary contacts on the reel housing to maintain circuit continuity with the probe. The 9.0 V (dc) circuit is continued from the terminal box on the reel housing through buried cable directly to the instrument panel in the 241-AW-271 Instrument Control Building where alarm activation and annunciation occurs. If a conductivity probe senses liquid in the annulus, a signal is transmitted to the 241-AW-271 Instrument Control Building instrumentation panel, activating annunciators ANN-101-4 through ANN-106-4 (depending on location), and energizing the instrumentation panel alarm horn.~~

~~4. [4] Flake boxes were developed years ago at the Hanford Site by John Flake. There is no patent or trademark.~~

Attachment 2
11-ESQ-134
(190 Pages)

Information Provided to Respond to Ecology E-Mail
Comments on January 20, 2011

Responses to Ecology's Electrical Questions Regarding Enraf™ Installations

All of the wiring from the flake boxes are being reused in the field as part of the Enraf™ installation project. This will be done for all Enraf™ installations in all farms. Existing flake box wiring consists of one signal communication cable containing four individual wires and one cable for power. The signal cable is routed underground through conduit from a relay cabinet to the above ground flake box. ECN (Engineering Change Notice) 726946 rev 1 demonstrates this wiring being reused in AP farm as follows:

- Page 41 shows a typical aboveground junction box that will be installed near each riser and Enraf™ enclosure. The four wires in the existing cable are connected in this junction box to a cable which is routed a short distance to a terminal box on the Enraf™ unit.
- Using tank AP-101 as an example, page 65 shows the connections to be made inside Enraf™ terminal box AP101-WSTA-TBX-151. Wire run 126 is connected to TB (Terminal Block) 2 providing the connection to the AP271 leak detection relay enclosure and TMACS (Tank Monitoring and Control System). Only two of the four wires from the cable are used for this purpose. The remaining two wires are maintained in the Enraf™ terminal box as spares. A fail/safe alarm is in place so that if the two operating wires fail, the spares can then be used. On this same box, existing wire run 923 is used between new terminal box AP101-WST-TBS-101 and AP101-WSTA-TBX-151, TB1, to provide power to the Enraf™ unit. Wire run 922 provides digital communications the AP101 riser 69 annulus Enraf (AP101-WSTA-TBS-151) back to the Primary Enraf™ (AP-101-WST-TBX-101), which in turn runs back to the CPU inside of the 271-AP Control Room.
- Pages 80-81 show the existing wire runs to be used. For example, the only change to run 126 is that the flake box terminal connection point is being changed to the Enraf™ terminal box. As shown on pages 80-81, *AP101-WSTA-LIS-121C* changes to *AP101-WSTA-LDT-151.*
- The work instructions specify "Field fit and reroute existing Flake Box conduit per diagram on page 41 of this ECN."

In summary, information provided in ECN 726946 shows the use of existing flake box wiring for installation of Enrafs™ and precludes the possibility that energized wiring will be left in place. Thus, it is not possible that this project will cause stray current to be present in the soil that could cause cathodic protection/corrosion issues.

WRPS WORK RECORD

Document Number: TFC-WO-10-1379

2. Work Item Title: 241-AP Run Elect. Pwr. Tmac, CIU Comm. for ENRAFs Attachment 2-2

Date	Turnover, Problem Description, Action Taken	Feed Back (X)	Name	Craft/ Resource Type	Hours
6/23/10	STEP 4.1.1 LINED-OUT CIRCUIT	X	[signature]	PLMR.	
PEN/INK	14. IT WILL BE LOCKED OUT AT		[signature]	FWS	
	A LATER DATE.		[signature]	RP/RW SM	
6/23	Held pre job. Hung L/T. Isolated		Hay		
	All AP 071 Riser Flake boxes				
	per work instruction.				
6/23/10	PEN & INK STEP 4.1.1. TO MATCH L/T.		[signature]	PLMR.	
6/24	Started staging of material				
	And will continue disassembling				
	of flake boxes in Room along				
	with Relay cabinet work		[signature]		
6/28	Held pre job. Disconnected 16 m/T		Hay		
	per Step 4.4 of work package. Job				
	Site clean, no waste.				
	Begin removal per step 4.6.12.1		Hay		
6/29	Continue relay removal in 271-AP. Work		Hay		
	same tomorrow. Job site clean no				
	waste.				
7/12	Drew material today, Begin digging		Hay		
	tomorrow of weather allows. Job site				
	clean, no waste				
7/13	Performing excavations around AP-104		Hay.		
	didn't finish, Area roped off and				
	marked "open trench"				

Work History (and ISMS Feedback) Review Results: **Lessons Learned Needed? YES / NO** (circle one)

Reviewed By:

Work Control Center

Print/Type Name _____ Signature _____ Date _____

A-6003-243 (REV 1)

WRPS WORK RECORD

Document Number: TFC-WO-10-1379

2. Work Item Title: 241-AP Run Elect. Pwr. Tmac, CIU Comm. for ENRAFs

Date	Turnover, Problem Description, Action Taken	Feed Back (X)	Name	Craft/ Resource Type	Hours
7/14	Completed conduit install for AP-104 including FS Boxes, Conduit and hoffa boots.		Hay		
7/15	Held pre job. Began excavations at AP-102. Job Site clean, no waste		Hay		
7/18	Dug trenches at AP-107 and AP-108. Caution taped and posted all open trenches		Hay		
7/26/10	~~WCN-01~~ PEN/ENK change to steps 4.6.2 and 4.6.8 to match ECN-726946 Revision 1 page 89. Also changed work step 4.6.4 to show correct conduit size from Temporary power outlet to Transfer switch to be 3/4" conduit instead of 1" ECN to Follow No Additional Introduced Hazards	X	[signature] Terry Rhis Engineering Above [signature] [signature]	Planner Per-Telecon FWS Shiftm	JAK
7/26	Completed conduit install at AP-108 and began backfilling trench.		Hay		
7/27	Completed conduit install at AP-107 and began backfilling trench		Hay		
7/28	Dug trench at AP-101, roped off with caution tape.		Hay		

Work History (and ISMS Feedback) Review Results: **Lessons Learned Needed? YES / NO** (circle one)

Reviewed By:

Work Control Center

Print/Type Name _____ Signature _____ Date _____

A-6003-243 (REV 1)

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WRPS WORK RECORD

1. Document Number: TFC-WO-10-1379

2. Work Item Title: 241-AP Run Elect. Pwr. Tmac, CIU Comm. for ENRAFs

Date	Turnover, Problem Description, Action Taken	Feed Back (X)	Name	Craft/ Resource Type	Hours
7/29	Began conduit install at AP-101 continue tomorrow.		Hay		
7/30	Didn't get much farm work done AP farm is VCT, Exhauster Shutdown due to lighting.		Hay		
8/1	Dug trench for AP-103 and AP-105. Taped off area and applied correct signage to warn of open trenches.		Hay		
8/2	layed conduit in trench at AP-105.		Hay		
8/3	Completed conduit and hoffa boot install at AP-105. Also backfilled trenches.		Hay		
8/4	Began conduit and hoffa boot install at AP-103.		Hay		
8/5	Completed conduit and hoffa boot install at AP-103		Hay		
8/9	Began digging at AP-106.		Hay		
8/10	Completed digging at AP-106 and began conduit install		Hay		

Work History (and ISMS Feedback) Review Results: **Lessons Learned Needed? YES / NO** (circle one)

Reviewed By:

Work Control Center

Print/Type Name *Signature* *Date*

A-6003-243 (REV 1)

WRPS WORK RECORD

Document Number: TFC-WO-10-1379

2. Work Item Title: 241-AP Run Elect. Pwr. Tmac, CIU Comm. for ENRAFs

Date	Turnover, Problem Description, Action Taken	Feed Back (X)	Name	Craft/ Resource Type	Hours
8/11	Continue conduit and hoffa boot install at AP-106		Hay		
8/12	Completed conduit and hoffa boot installation.		Hay		
8/13	Begin setting racks at AP-107 AP-106.		Hay		
8/16	ADDED TAG 2 LTT TO ALLOW ELECTRICAL WORK IN THE FARM. TAG 3 WILL BE ADDED AT A LATER DATE FOR MANUAL TRANSFER SWITCH & CIU SMARTLINK		[signature]	SM	
8/19/10 WCN-01	Added ECN-10-000825 TO THE SCOPE OF WORK. THIS ECN CORRECTS THE MANUAL TRANSFER SWITCH EIN NUMBER AND ADDS THE HEW ALLEN BRADLEY RELAYS (OM ROAD) ALSO CORRECTS THE JUNCTION BOXES FROM FS TO FDD3 A USQ EVALUATOR WILL BE CONSULTED. THIS ECN ALSO SHOWS THE CORRECT JUMPER WIRE FROM THE MODEM AND CIU INTERNAL. NO USQ REQUIRED		[signature]	FWS	
			[signature]	PCM	
			Steve Lowlosk	USQ Eval	
			Robert Nicholsm	Sys Eng	1/4
			[signature] 8/19/10		1/4
			Kaleem Ullah	Design Engineering.	
			[signature]	Plan.	
			[signature]	SM	

Work History (and ISMS Feedback) Review Results: Lessons Learned Needed? YES / NO (circle one)

Reviewed By:

Work Control Center

Print/Type Name _____ Signature _____ Date _____

WRPS WORK RECORD

Document Number: TFC-WO-10-1379

2. Work Item Title: 241-AP Run Elect. Pwr. Tmac, CIU Comm. for ENRAFs

Date	Turnover, Problem Description, Action Taken	Feed Back (X)	Name	Craft/ Resource Type	Hours
8/19/10	Consulted with Design				
Pen/ink	Engineering to allow				
WCN.01	The craft to install				
	~~not to~~ Jumper from				
	Enrat Terminal boxes		Jmk	Pwr Design	
	to the local hand switches		Kaleem Ullah	Engrng.	
	as #14 wire size.		[signature] 8/20	Plant	
	Consulted USQ Evaluator.		[signature]	Eng	1/4
	This is just to clarify.		Robert Nicholson		
8/16	Begin modification of existing racks and installing conduit labels.		Hay		
8/17	Continued ~~Conduit~~ 8/17/10 jmk conduit labeling and rack modification in AP farm		Hay		
8/18	Begin bonding of enrat J Boxes.		Hay		
8/19	Began pulling wire at AP-107,108. Completed rack mods, labeling and bonding.		Hay		
8/23	Held pre job. Continued wire of stands at AP-105, AP-106 and AP-107.		Hay		
8/24	Continue wiring stands and pulled wire and installed flex at AP-101 thru AP-104		Hay		
8/25	Continue stand wiring at AP-101-104		Hay		

Work History (and ISMS Feedback) Review Results: **Lessons Learned Needed?** **YES / NO** (circle one)

Reviewed By:

Work Control Center

Print/Type Name _____ Signature _____ Date _____

WRPS WORK RECORD

.. Document Number: TFC-WO-10-1379

2. Work Item Title: 241-AP Run Elect. Pwr. Tmac, CIU Comm. for ENRAFs

Date	Turnover, Problem Description, Action Taken	Feed Back (X)	Name	Craft/ Resource Type	Hours
8/26	Continue Stand Wiring at AP-101 thru AP-104		Hay		
8/27	Began installing flex due to interferance with ops AT AP-103		HAy		
8/29	Completed AP-103 and continue install flexes for Signals		Hay		
9/1/10					
WCN-02	Added FCN-ECN-10-001073				
	Reconfiguration of wiring				
	To The New Relays per				
	Section 4.6.12. Walk Down				
	With Craft, FWS, Engineering				
	Talked About Incorporation			ENG	
	Of All Changes To Aprmanent			SM	
	FCN. NO Additional Hazards Were			Planner	
	Affected By This Change.			FWS	
9/2/10	per Engineering Direction				
	In The Existing Cass Terminal				
	Box have Craft Remove The				
	Electronic Board And		Per Tele-con		
	Disguard. This Box is used		DAVE BARNES	ENG.	
	As A Splice Junction Box			FWS	
	Only.			Planner	
9/7/10	QC In-Process Tagged				
	CIU until Removed From				
	AP271-WSP-ENCL-014 No Damage Noted		K. Wilson	QC	

Work History (and ISMS Feedback) Review Results: Lessons Learned Needed? ~~YES~~ / NO (circle one)

RETURNED UNIT TO SPARES / MATERIAL CORDNATOR KW 9/7/10

Reviewed By:

Work Control Center

Print/Type Name _____ Signature _____ Date _____

WRPS WORK RECORD

1. Document Number: TFC-WO-10-1379

2. Work Item Title: 241-AP Run Elect. PWR, TMACS, CIU Comm. for ENRAF's

Date	Turnover, Problem Description, Action Taken	Feed Back (X)	Name	Craft/ Resource Type	Hours
P&I#3	Incorporation of FCN-10-000997				
9/15/2010	1.)allowed for alternate power transfer				
	switch				
	2.)Evaluation to clarify wire size to be				
	used from the WSTA TBX and Hand switch				
	3.)add additional Phoenix Contact				
	terminal blocks to TB2, and change the				
	Phoenix Contact fixed bridge bar location				
	in all WSTA junction boxes.				
	4.)Adds a 24VDC Power supply and 40				
	Phoenix terminal blocks.				
	5.)Changes wiring on drawing H-2-90476				
	sht 8 rev 14 from page 2 of ECN-10-001073		[signature]	PLANNER	
	and page 15 of ECN 10-000825 to match the				
	configuration found on page 30 of		[signature]	ENGINEER	
	FCN 10-000997.				
	6.)changes wiring on drawing H-14-103176		[signature]	FWS	
	sht 4 rev 1 and Sht 5 rev 1 from pages 64		[signature]	JM	
	thru 79 of ECN 726946 rev 1 to match the				
	configuration found on FCN 10-000997				
	pages 6 thru 25.				
	USQ TF-10-0709 R7 addresses this FCN				
9/16	INSTALLED L+T 241AP-10-10				
	TAG 3 AND FULL RELEASED PKG		[signature]	JM	
9/16	Continue wiring in relay enclosure per attached ECN.		Hay		
9/17	Completed wiring relay cabinet need lock and tag to land wires in DO Panel		Hay		

Work History (and ISMS Feedback) Review Results: **Lessons Learned Needed? YES / NO** (circle one)

Reviewed By:

Work Control Center

Print/Type Name *Signature* *Date*

A-6003-243 (REV 1)

WRPS WORK RECORD

Document Number: TFC-WO-10-1379

2. Work Item Title: 241-AP Run Elect. PWR, TMACS, CIU Comm. For ENRAF's

Date	Turnover, Problem Description, Action Taken	Feed Back (X)	Name	Craft/ Resource Type	Hours
9/17	Hung lock and Tag. Terminated ~~Need~~ new 9/21/10 #10 wires and installed 30 Amp circuit breaker in DP Panel.		Hay		
9/23/10 P&I#4	ADDED STEP 4.10 AND REMOVED THE WORD TMACS from STEP 5.3		[signature] PT for Chris McCoy	Planner PNG 1045 9/23/10	
			[signature]	FMS	
			[signature]	QC/SM	
9/23	Held pre job. Programed enraf RX TO DO to allow units to alarm correctly and be fail safe. Job site clean, no waste		Hay		
9/26	Held pre job. Installed generator into outside receptacle and tested alternate power source. Everything powered up fine and returned to shore power. Completed cals on DL-114221 with exception of AP-101-153. TFC-WO-10-4057 Refined AP-101-153		[signature]	Elec.	
9/28/10	Updated PM data sheets - note this update is tied to Sister work pkg TFC-WO-10-1378		[signature]	Engr.	
	DL-114221 Completed PM AP-101-153		[signature]	Elec.	
9/28/10	Procedure 3-LDD-629 inactivated. Data sheets and download log updated.		RSN Robert Nicholson. [signature]	Engr 9/28/10	

Work History (and ISMS Feedback) Review Results: Lessons Learned Needed? YES / NO (circle one)

Reviewed By:

Work Control Center _____ (Print/Type Name) _____ (Signature) _____ (Date)

WRPS WORK RECORD

Document Number: TFC-WO-10-1379

2. Work Item Title: 241-AP Run Elect. PWR, TMACS, CIU Comm. For ENRAF's

Date	Turnover, Problem Description, Action Taken	Feed Back (X)	Name	Craft/ Resource Type	Hours
11/30/10	WCN-03 Add final ECN-10-001212				
	To incorporates Field Changes				
	made per ECN 726946, R1 which				
	is Numbered as FCN-ECN-10-001073				
	AND FCN-10-000997 Need		[signature]	Planner-	
	Engineering To sign modifications		[signature]	SM	
	completed on All (3) ECN's				
	So This Work package can close		[signature]		
	out.		Robert Nicholson	Eng	1/2
12/6/10	Signed / released ECNs		Robert Nicholson	Eng	1/2
	(3) work complete.		[signature]		
12/21	late Entry: Forgot to include		Hay		
	NEC report for closeout. Had				
	NEC inspector mail use a				
	new one and included in				
	work package.				
12/21/10	POST Review completed				
	All work satisfactory				
	completed put together				
	Final ECN Field configuration				
	Folder for Base operation				
	for System Maintenance.		[signature]	Plan.	

Work History (and ISMS Feedback) Review Results: Lessons Learned Needed? YES / NO (circle one)

Reviewed By:

Work Control Center

Print/Type Name | Signature | Date

A-6003-243 (REV 1)

Work Order: TFC-WO-10-1379

Title: 241-AP Run Elect. Pwr. Tmac, CIU Comm. for ENRAFs

Date Created: 4/9/10 11:45:14
Equipment: 241-AP-ANN-LDK
SC/I: ☐
WorkFlow: WO Standard
Planner: Hebert, Larry J
Job Plan:
WO Type: 4 - MODIFICATION
Assigned: Hay, Mike
Farm/Facility: 241AP
State: Ready For Work
Phase Desig:
PM Id:
RAD Risk: Low
Flow Status: OK
Frequency:
CACN: 200654
Project Id:
Date Reqd: 4/9/10 09:25:35
Priority: 2.2 Environmental Compliance
Route Id:

Description:

241-AP, Support Installation of Enraf assemblies (24) in place of manual tapes (3 PER TANK) on tanks ANNULUS FOR AP-101,102,103,104,105,106,107 AND 108. This package will Provide necessary power and communication lines in order to connect all Enrafs to T-MACS through a common CIU as shown in ECN-726946, rev.o.

Work Order: TFC-WO-10-1379

Title: 241-AP Run Elect. Pwr. Tmac, CIU Comm. for ENRAFs

Step 1 **Of** 1 **Step Id:** 001 **State:** Ready For Work **Safety Class:**

Sched Start: **Sched Comp:** **Related Step/Link:**

Step Instructions:

See attached work instructions:

Assets	Seq	Asset Class	Asset Id	Asset Name	SC/I	Expiration Date
	1	Equipment	241-AP-ANN-LDK	LEAK DETECTION,ANNULUS	☐	

Trades	Crew	Trade Id:	Trade Description:	Workers	Act Hrs.	Delay Code
		C020	Electricians	8		
		P070	Planner/Scheduler/Estimators	1		
		P090	Industrial Hygienists	1		
		R040	Nuclear Plant Operators	2		
		T050	Health Physics Technicians	1		
		M010	First Line Supervisors	1		

Attachments: There are 16 document(s) attached to this work order

Description	Path/Name
Step Attachment	
TFC-WO-10-1378 AP-101 - AP-108 Enraf mech RECORI	TFC-WO-10-1378 AP-101 - AP-108 Enraf mech RECORD r2 __1073374.doc
TFC-WO-10-1379 AP-101 - AP-108 LDT Temp rounds .d	TFC-WO-10-1379 AP-101 - AP-108 LDT Temp rounds __1072686.doc
MIRF 10-1378_1379.docx	MIRF 10-1378_1379__1072854.docx
AP Electrical Hazard Eval.pdf	AP Electrical Hazard Eval__1073273.pdf
AP Engineering Cross reference list .pdf	AP Engineering Cross reference list __1072688.pdf
AP-Farm ENRAF Upgrades Revised Route Ground Scan	AP-Farm ENRAF Upgrades Revised Route Ground Scan #2__1069104.pdf
ECN-726946-R1_-_[1005241121].pdf	ECN-726946-R1_-_[1005241121]__1072690.pdf
RWP TF-100 .pdf	RWP TF-100 __1072695.pdf
RWP-TF-106, Rev 3.pdf	RWP-TF-106, Rev 3__1072696.pdf
SCAN REPORT	AP-Farm ENRAF Upgrades Ground Scan__1069103.pdf
TFC-10-1379 MSDS.pdf	TFC-10-1379 MSDS__1072826.pdf
TFC-WO-10-1379 EXCAVATION PERMIT.pdf	TFC-WO-10-1379 EXCAVATION PERMIT__1072692.pdf
TFC-WO-10-1379 JHA .pdf	TFC-WO-10-1379 JHA __1073219.pdf
TFC-WO-10-1379 wpckl.pdf	TFC-WO-10-1379 wpckl__1073360.pdf
USQ-TF-10-0709-D.pdf	USQ-TF-10-0709-D__1072863.pdf
TFC-WO-10-1379 Planning checklist .xdf	TFC-WO-10-1379 Planning checklist __1073341.xdf

Electronic Approvals:

Date	State	Response	Profile	Name	Role
4/9/10 11:45:14	Ready For Planning	Approved	ret_&_bo_ops_shift_mgr	Schaleger, John	
5/25/10 10:16:01	In Planning	Approved	ret_&_bo_planner	Hebert, Larry J	
6/14/10 16:57:22	In Approval	Approved	ret_&_bo_planner	Hebert, Larry J	bo_planner
6/15/10 11:58:14	In Approval	Approved	ret_&_bo QA	Heaney, Jerry	bo_qa
6/17/10 09:53:16	In Approval	Approved	ret_&_bo_environ	Tifft, Sherm	bo_environmental

Work Order: TFC-WO-10-1379

Title: 241-AP Run Elect. Pwr. Tmac, CIU Comm. for ENRAFs

Electronic Approvals:

Date	State	Response	Profile	Name	Role
6/18/10 11:19:23	In Approval	Approved	ret_&_bo Resp. Eng.	Nicholson, Robert s (Bob)	ret_&_bo resp. eng.
6/21/10 10:53:24	In Approval	Approved	ret_&_bo_ind_hygiene	Cranston, Mark	ret_ind_hygiene
6/21/10 10:58:32	In Approval	Approved	ret_&_bo_safety	Tveit, Mark	ret_safety
6/22/10 15:11:43	In Approval	Approved	ret_&_bo_planner	Hebert, Larry J	bo_planner
6/22/10 15:11:43	In Approval	Approved	ret_&_bo_planner	Hebert, Larry J	fws - per telecon
6/22/10 15:14:46	In Approval	Approved	ret_&_bo_planner	Hebert, Larry J	fws - per telecon
6/22/10 15:15:03	Ready For Work	Approved	ret_&_bo_planner	Hebert, Larry J	

FWC

FWS Completed By: JMR **FWC Date:** 11/17/10 **Update Job Plan (Y/N):** _____

Completed Satisfactorily(yes,no): Y **Asset Condition:** _____

Comments: _____

Work Records

Type	Created By:	Created On:
Status Tracking	Hebert, Larry J	6/14/10 17:11:29

JHA walkdown completed, wtih field work supervisor, electricians, HPT IHT, IH sme, HP sme, pipe fitters, JHA being initiated to completion,

Status Tracking	Hebert, Larry J	6/21/10 11:37:55

address the transfer line with-in 5 feet of Excavation, per Engineering at one point we will be with in the 5 feet boundary and the other end of the tanks we will be more than 6-8 feet of the boundary. Per engineering once a transfer has been completed a flush of the piping is performed to control radiological sources. The transfer lines will be locked out during this work. Planning contacted Radcon SME and discussed the Excavation within the 5 foot of the transfer lines. and to review the radcon control as outlined in procedures-TFC-ESHQ-RP-ADM-P-01, REV.C-5. and TFC-ESHQ-RP-MON-C-11-REV. B-2. Radcon sme provided the RWP and do to locking out the transfer lines, and flushing no HRA will be required at this time an HPT will perform continious monotoring during excavation.

Status Tracking	Hebert, Larry J	6/22/10 15:15:17

Planning recieved all the approvals and reiceved per-tele-con approval from the FWS -Mike Hay and Ron Jones. package ready for work release.

WO Id: TFC-WO-10-1379

Waste Planning Checklist

1. Will waste be generated?	Yes
2. Will waste be generated in a radiological buffer area or contamination area?	Yes
3. Will EQ be removed? (TF-cover blocks, 222S-Process EQ)	No
4. Will waste contact process waste, tank waste, or tank waste contaminated material?	No
5. Will work involve soil removal?	Yes
6. Will there be any aerosol can(s) disposed of?	No
7. Will asbestos waste be disposed of?	No
8. Will HEPA filters be disposed of?	No
9. Will chemical products or paint be used or disposed of?	Yes
10. The following waste minimization techniques will be used?	source reduction

CHEMICAL/PAINT PRODUCTS

Msds No	Chemical / Product Name
010001B	SOO739 Bright Zinc Cold Galv.
013977B	LPS Cold Galvanize
015375B	Cold Galv Zinc Coating CRC Ind
015583C	Zlin-It Instant Cold Galvanize
010026A	LPS Rust Inhibitor
012261	Simple Green
020641	Safeguard 5022A
011716A	Never Seez

11. GENERAL DESCRIPTION OF WASTE

thhn wire, cable, conduit, relays, tape, paper, metal plate, raggs, plastic, electrical cabinets (Junction Boxes), unistrut, tywraps, bare copper wiring,metal screws.

11a. Estimate Waste Generated Quanity: 500 LBS Per: Week Job Length 4 weeks

WASTE MANAGEMENT CONTROLS **Comments**

12. Is Waste Regulated as a Dangerous Waste? Yes Regulated products

12a. Disposition Instructions:

- Bring into the radiological are only materials/products needed for the job.
- Survey and release unused products, then return to stock future use.
- Ensure no free liquids present.
- Manage and package the waste per TO-100-052 procedure.

Mixed Waste Disposal:
- Any debris waste containing the following products: SOO739 Bright Zinc Cold Galv (010001B), LPS Cold Galvanize (013977B), Cold Galv Zinc Coating CRC Ind (015375B), Never Seez (011716A), Simple Green >2.9%, Safegard >2.4% and Zlin-It Instant Cold Galvanize >6% by weight (015583C).
- FWS to request a container and confirm delivery prior to the start of the work.

Low-Level Waste Disposal:
- Dispose of the soft debris waste (e.g., paper, plastic, cloth, rubber,etc.) without the regulated products listed above into the nearest low-level waste collection trailer.
- For metal debris waste items with a size greater than a bread basket, provide estimated dimensions, perform dose and smear survey, then record the results on a RSR. Provide the results to Technical Waste Services. The survey will determine whether these waste items meets Surface Contaminated Object criteria, which can be shipped in an IP-I or IP-II type containers. These waste items should not be placed in a waste container until the SCO determination is complete.

Waste Designation:
- Regulated as products and on debris in any amount: SOO739 Bright Zinc Cold Galv (010001B), LPS Cold Galvanize (013977B) and Cold Galv Zinc Coating CRC Ind (015375B)
- Regulated as products, but on debris with <less the regulated amounts stated above are no longer regulated: Simple Green, Safegard 5022A fixative and Zlin-It Instant Cold Galvanize.
- Regulated as a product, but on debris is no longer regulated: LPS Rust Inhibitor

13. Facility Operations has been notified to take samples? (N/A if not required)	N/A	
14. Is a container already available for each disposition listed in the instructions?	No	request containers
15. Does the quantity of the waste exceed capacity of available containers?	No	
16. Identify satellite accumulation area or accumulation area container(s) locations:	See 12a.	

Prepared By:Mandrake Pascual Date: 06/16/2010 Complete: ☑

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

1.0 SCOPE:

- 241-AP Annulus ENRAF, This work package will install the Electrical Equipment needed to feed new (**24**) Enraf ALD's (**3 per tank**) on Annulus Risers (069), (070) and (071) Per **ECN-726946 Rev.1** and **ECN-10-000196, Rev.o** as follows: ECN - 10 - 000 825 FCN-ECN-10-001073 FCN-10-000997
  - IN support of the new Enraf (s) (24) installation this work package will disconnect the following manual tapes (1 per tank) to support operations in continuous monitoring for leaks in the Annulus for tanks AP-101 through AP-108. See data sheets attached in this work package.
    - AP**101**-WSTA-LIS-121B (071) AP**102**-WSTA-LIS-122C (071) AP**103**-WSTA-LIS-123B (071) AP**104**-WSTA-LIS-124C (071) AP**105**-WSTA-LIS-125A (071) AP**106**-WSTA-LIS-126C (071) AP**107**-WSTA-LIS-127A (071) AP**108**-WSTA-LIS-128C (071)
    - Install manual transfer switch adjacent to junction box AP271-WST-JBX-014. This will allow the leak detectors and CIU to be supplied power either from power distribution panel AP271-ESD-DP-101 or a portable generator.
    - Install a Weather Protective Power Connector receptacle AP271-EDS-RCPT-101 for alternate power to the transfer switch shall be mounted on the outside wall of AP271, North side as required per National Electrical Code.
    - Reconfiguration of the LIT terminal box wiring for power and CIU connections where applicable and modify existing CIU for new CIU Smartlink installation.
    - Remove existing Annulus leak detection relays and replace with new ~~potter Brumfield~~ relay, and rewire per ECN.
    - Install new Electrical stand, Excavate trenches, Route conduit, install pull boxes to existing Enraf stands.
    - Pull power and signal wiring from existing Enraf stands to the 24 ALD stands and Terminate wiring at Enraf stands and the 24 ALD stands.
    - Perform final field functional operation of each new Enrafs listed below per ECN-726946.

      AP101-WSTA-LDT-151 (069) AP101-WSTA-LDT-152 (070) AP101-WSTA-LDT-153 (071)
      AP102-WSTA-LDT-151 (069) AP102-WSTA-LDT-152 (070) AP102-WSTA-LDT-153 (071)
      AP103-WSTA-LDT-151 (069) AP103-WSTA-LDT-152 (070) AP103-WSTA-LDT-153 (071)
      AP104-WSTA-LDT-151 (069) AP104-WSTA-LDT-152 (070) AP104-WSTA-LDT-153 (071)
      AP105-WSTA-LDT-151 (069) AP105-WSTA-LDT-152 (070) AP105-WSTA-LDT-153 (071)
      AP106-WSTA-LDT-151 (069) AP106-WSTA-LDT-152 (070) AP106-WSTA-LDT-153 (071)

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

AP107-WSTA-LDT-151 (069) AP107-WSTA-LDT-152 (070) AP107-WSTA-LDT-153 (071)
AP108-WSTA-LDT-151 (069) AP108-WSTA-LDT-152 (070 AP108-WSTA-LDT-153 (071)

2.0 LIMITATIONS & PRECAUTIONS

[ ] 2.1. Field work supervisor will contact NEC inspector to coordinate inspections as work progresses.

[ ] 2.2. System Engineer has identified the system to be worked on as General Service (GS).

[ ] 2.3. **Ensure Environmental** has **notified Ecology seven (7) days** prior to field work commencing when the 241-AP ALDs are taken out of service.

[ ] 2.4. QAT will install an in process tags on CIU components that will be removed and put in spares for future use.

[ ] 2.5. Per the System Engineer, Bob Nicholson, there are active transfer lines in the area where excavations will occur. See Excavation Permit (**DAN-4120**) and Crossing List for details.

[ ] 2.5.1. Excavation routes shown on ECN are within 5 feet of a physically connected transfer line.

[ ] 2.5.2. If a waste transfer is in progress ensure the following controls are applied (ref. TFC-ESHQ-S_IS-C-03), as required:

NOTE- DOCUMENTED SURVEYS ARE REQUIRED FOR OPENING POTENTIALLY CONTAMINATED SYSTEMS OR ITEMS, ACCESSING PREVIOUSLY UNEXPOSED SURFACES, EXCAVATING OR WHEN REQUIRED BY PROCEDURE.

[ ] 2.5.2.1. Ensure continuous HPT coverage is provided during excavation work.

[ ] 2.5.2.2. **RWP TF-106** (latest rev) shall be used for all excavations 12" or greater as required by NEC code. All other work activities will be covered by **RWP TF-100** (latest rev.).

[ ] 2.6. The following controls are required for hand excavation:

[ ] 2.6.1. In support of excavation activities, Electrician to perform monitoring for possible underground energized cables. (Lesson learn).

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

[ ] 2.6.2. A local wind speed measurement device may be utilized in lieu of Hanford Meteorological Station, provided the reading is taken in an unobstructed location that is representative of the work area. Use of a local device and the measured wind speed must be documented in the JCS Work Record. For excavation in CA's, HCA's, SCA's, and URMA's, if beta-gamma activity greater than 1000 dpm/probe area (5000 dpm/100cm^2) is identified, alpha surveys will be performed.

[ ] 2.6.3. Excavation of radioactive material is not allowed when winds exceed 20 MPH.

[ ] 2.6.4. When hot specks (i.e less than or equal to 100 cm^2 of contamination reading greater than or equal to 1,000,000 dpm/probe beta/gamma are detected remove the speck or/and/or greater than or equal to 490 dpm/probe alpha) and/or contain them. If a hot speck is found in the bottom of the excavation, after excavation has been completed, you may cover with clean fill.

[ ] 2.6.5. Suppressants such as water, fixatives, covers, or windscreens will be used at the end of each shift if sustained or predicted winds are >20 mph.

[ ] 2.6.6. Erect personnel warning signs and barricades at excavation(s), as needed.

[ ] 2.6.7. Excavated area(s) will be moist prior to disturbance.

[ ] 2.6.8. Segregate soils to separate "clean" from "contaminated" spoils piles.

[ ] 2.6.9. Soils shall be placed on plastic until back-filled. Cover soils removed from excavation(s) with plastic, between removal and back-filling.

[ ] 2.6.10. Backfill and compact soil as needed.

[ ] 2.7. For manual lifts, a minimum of two people or material handling aids shall be used for lifts over 40 lbs.

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

3.0 PREREQUISITES:

[ ] 3.1. Conduct a **Pre-Job Briefing**.

[ ] 3.1.1. A pre-job briefing MUST BE performed prior to any pre-requisite work activities or fieldwork.

[ ] 3.1.2. See **attached Lessons learned** in the work package.

[ ] 3.1.3. **Warning** -exercise proper electrical precautions and craftsmanship when working around other voltage sources, "that may not be De-energized".

[ ] 3.1.3.1. Enclosures that this work requires to work within will have energize sources, Avoid contact, install voltage rated Barrier as required in accordance with **TFC-ESHQ-S-STD-03,** And document location on the work record.

NOTE- STEPS (3.2) THROUGH (3.7) MAY BE WORKED CONCURRENTLY OR IN ANY ORDER AS DIRECTED BY FWS.

[ ] 3.2. FWS to ensure completed excavation permit is in work package.

[ ] 3.3. Ensure materials to perform this activity are staged and ready for use.

[ ] 3.4. Ensure appropriate numbers of spotters are assigned for all vehicle movement inside the tank farm boundary and follow the route map, when applicable.

[ ] 3.5. FWS ensure that the Dome Load Vehicle Route map is approved and in the work package.

[ ] 3.6. HPT perform pre-job survey. Document RSR # on the Work Record.

[ ] 3.7. The **OE** has **verified** that there are **no ongoing transfers physically connected to AP farm.**

[ ] 3.8. Contact Shift Operation manager to **Ensure** that they are prepared to track the following (**8**) (Manual tapes) Level devices being removed from service and has given permission to proceed by signature below. **Operation will use** these manual tapes **to perform continuous monitoring for leaks in the Annulus** for tanks AP-101 through AP-108. Per **data sheet attached** in this work package, written in accordance with TFC-OPS-OPER-C-08, REV. B21.

AP101-WSTA-LIS-121B (071) AP102-WSTA-LIS-122C (071) AP103-WSTA-LIS-123B (071)
AP104-WSTA-LIS-124C (071) AP105-WSTA-LIS-125A (071) AP106-WSTA-LIS-126C (071)
AP107-WSTA-LIS-127A (071) AP108-WSTA-LIS-128C (071)

P. Tuohy / 6-23-10

SOM SIGNATURE DATE

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

[ ] 3.9. The Shift Manager/OE, TMACS and 242-A Operator have been notified of the modification work to be performed in AP farm and alarms will be activated for the Annulus pump pits and leak detector pits 3C and 5C.

JMH / 6/23/10
FWS SIGNATURE DATE

4.0 SPECIFIC WORK INSTRUCTIONS:

[✓] 4.1. **Ensure** that components are positioned, tagged, and locked in accordance with the Lock and Tag Program.

[✓] 4.1.1. Install lock and tag AP271-EDS-DP-101, Circuits 11 ~~and 14~~. JMH 6/23/10

[✓] 4.2. Disconnect the following manual tapes **(1 per tank)** to support **operations** in **continuous monitoring** for **leaks** in the **Annulus** for tanks AP-101 through AP-108.

- AP101-WSTA-LIS-121B (071) AP102-WSTA-LIS-122C (071) AP**103**-WSTA-LIS-123B (071)

JMH / 6/23/10	JMH / 6/23/10	JMH / 6/23/10
FWS initial / Date	FWS initial / Date	FWS initial / Date

AP104-WSTA-LIS-124C (071) AP**105**-WSTA-LIS-125A (071) AP106-WSTA-LIS-126C (071)

JMH / 6/23/10	JMH / 6/23/10	JMH / 6/23/10
FWS initial / Date	FWS initial / Date	FWS initial / Date

AP**107**-WSTA-LIS-127A (071) AP108-WSTA-LIS-128C (071)

JMH / 6/23/10	JMH / 6/23/10
FWS initial / Date	FWS initial / Date

NOTE- AT THIS POINT OPERATIONS HAS ACCEPTED RESPONSIBILITY TO PERFORM TEMPORARY ROUND SHEETS FOR THE (8) MANUAL TAPES (1) PER TANK, AT LEAST ONCE IN A 24 HOUR PERIOD.

[✓] 4.3. FWS to Contact Shift Operation manager to **Ensure** that they are prepared to track the following (**16**) (Manual tapes) Level devices being removed from service and has given permission to proceed by signature below.

AP101-WSTA-LIS-121C (069) AP101-WSTA-LIS-121A (070) AP102-WSTA-LIS-122B (069)
AP102-WSTA-LIS-122A (070) AP103-WSTA-LIS-123C (069) AP103-WSTA-LIS-123A (070)
AP104-WSTA-LIS-124B (069) AP104-WSTA-LIS-124A (070) AP105-WSTA-LIS-125C (069)
AP105-WSTA-LIS-125B (070) AP106-WSTA-LIS-126A (069) AP106-WSTA-LIS-126B (070)
AP107-WSTA-LIS-127C (069) AP107-WSTA-LIS-127B (070) AP108-WSTA-LIS-128A (069
AP108-WSTA-LIS-128B (070)

RWJ / 6/24/10
FWS SIGNATURE DATE

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

[ ] 4.4. Disconnect the following (**16**) (Manual tapes) Level devices in accordance with ECN-726946.

[✓] AP101-WSTA-LIS-121C (069)	[✓] AP101-WSTA-LIS-121A (070)
[✓] AP102-WSTA-LIS-122B (069)	[✓] AP102-WSTA-LIS-122A (070)
[✓] AP103-WSTA-LIS-123C (069)	[✓] AP103-WSTA-LIS-123A (070)
[✓] AP104-WSTA-LIS-124B (069)	[✓] AP104-WSTA-LIS-124A (070)
[✓] AP105-WSTA-LIS-125C (069)	[✓] AP105-WSTA-LIS-125B (070)
[✓] AP106-WSTA-LIS-126A (069)	[✓] AP106-WSTA-LIS-126B (070)
[✓] AP107-WSTA-LIS-127C (069)	[✓] AP107-WSTA-LIS-127B (070)
[✓] AP108-WSTA-LIS-128A (069	[✓] AP108-WSTA-LIS-128B (070)

NOTE- STEPS 4.5, 4.6 AND 4.7 AND THEIR SUB-STEPS MAY BE WORKED CONCURRENTLY, IN ANY ORDER OR IN PARALLEL, AS DIRECTED BY THE FWS.

[✓] 4.5. Field work supervisor will contact **NEC inspector** to coordinate inspections as work progresses per work steps 4.6 and 4.7.

AP271 BUILDING:

241 #3 1-15-10 DH

[✓] 4.6. Field route and install the transfer switch AP271-EDS-MTS-101, isolation transformer AP241-EDS-XFMR-101 and receptacle AP271-EDS-RCPT-101 per **ECN-726946,Rev.1** pages **89** and **84, ECN-10-000196, Rev.o** and the following. AND FCN-10-000197 PAGE 26

[✓] 4.6.1. **AP271-EDS-RCPT-101**, Field route and install A Weather Protective Power Connector for alternate power to the transfer switch, The Power connector shall be mounted on the outside wall of AP271, North side as required and in accordance with National Electrical Code.

WCN-01 per INC Additional change. MK

[✓] 4.6.2. **AP271-~~EDS~~-MTS-101**, Field mount the transfer switch on the wall and in the vicinity of the junction box AP271-WST-JBX-014.

[✓] 4.6.3. **AP241-EDS-XFMR-101,** Field mount the isolation transformer on the wall and in the vicinity of the junction box AP271-WST-JBX-014.

per INC change MK WCN-01

[✓] 4.6.4. Field route/install 1" (3/4") conduits (P 780/P 781), wire runs (WR 970 /WR 971) and label conduit and wiring. Reference ECN page 89 and 84.

[✓] 4.6.5. Isolation transformer AP241-EDS-XFMR-101 shall be grounded to the building ground grid, field route as required. Ref: ECN, page 94.

[✓] 4.6.6. **AP271-WST-JBX-014**, In junction box install three **15A** Allen Bradley **circuit breakers** on existing din rail for wire runs 793, 794 and 1065 as shown on page 89 of this ECN.

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

NOTE- PRIOR TO PERFORMING THE FOLLOWING WORK STEP 4.6.7, COORDINATE WITH OPERATIONS, LOCK AND TAG ADMINISTRATOR TO LOCK OUT PANEL BOARD AP271-EDS-DP-101. (FEED FROM AP271-EDS-MCC-001, CUBICLE E3B, BRK-114)

[√] 4.6.7. **AP271-EDS-DP-101** Circuit breaker 14, Replace the existing **20A** with a **30A** (Siemens BLH30) circuit breaker as shown on pages 84, 86 of this ECN.

[√] 4.6.8. **AP271-EDS-DP-101** Circuit breaker 14, Disconnect/Remove #12 wiring back to AP271-WST-JBX-014 and replace with # 10 as shown on page 84,89 of ECN to **AP271-EDS-MTS-101.**

ECN 1014 Editorial change. JMB

JMB ~~WST~~ EDS 8/19/10

AP271-WST-ENCL-014: (CIU)

[√] 4.6.9. Contact **QAT** to install an in process tags on CIU components that will be removed and put in spares for future use.

[√] 4.6.9.1. Disassemble all components of the existing CIU (AP271-WST-ENCL-014) to make space for the new CIU **Smartlink** installation. Leave modem attached to the door and disconnect existing CIU wires. As shown on pages 84, 87, 88 and 93 of this ECN and as follows.

[√] 4.6.10. **AP271-WST-ENCL-014**, install new back plate per page 93 of ECN.

[√] 4.6.10.1. Pull in and terminate WR 790, 791, 792, 793 and 968 to CIU terminal strip as shown on page 84, 87 and 88 of this ECN.

[ ] 4.6.10.2. Add communication WR 968 and label Mod3. Reference ECN page 84, 88 and 93.

[√] 4.6.10.3. Terminate wire 968 from **CIU** to **(FIC)** Farm Interface Box TBX-CASS-241-AP-3 as shown on pages 87 and 88 of this ECN.

[ ] 4.6.10.4. Rename labels on WR 791 and 792 from TL1 and TL2 to Mod1 and Mod2 respectively. Reference ECN pages 88 and 93.

[√] 4.6.10.5. Assemble and complete wiring between new CIU Smartlink and field terminal block as shown on pages 88 and 93 of this ECN.

[√] 4.6.10.6. AP271-WST-ENCL-014, Reconnect wire runs from modem to terminal strip. Reference page 88 of ecn.

[√] 4.6.10.7. Add ground to enclosure back panel and door, Reference page 88 of ECN.

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

AP271 Relay Enclosure:

NOTE- ALARMS CONTACTS ON THE NEW ENRAFS RELAYS SHALL BE FIELD CONFIGURED SO THAT DURING NORMAL OPERATION CONTACTS SHALL BE NORMALLY OPEN/HELD CLOSED AND OPENS WHEN A LEAK IS DETECTED OR LOSS OF POWER TO ANY LDT ENRAF OCCURS.

[ ] 4.6.11. Set up **relay parameters** per note on ECN page 100.

[✓] 4.6.12. AP271 Leak detector **Relay Enclosure** loctaed in Building AP-271, Replace existing relays per the following in accordance with ECN pages 65,67,69,71,73,75,77 and 79.

[✓] 4.6.12.1. Remove existing Annulus Leak Detection relays and replace with new relays which shall be labeled as shown on page 6/96 of this ECN. New Potter & Brumfield relays part #KRPA-14DG-24 and Allen Bradley (time delay) off-delay relays part# 700-HRV52TU24 with din rail mount Allen Bradley relay base part #700-HN101. Reference **ECN** pages **96,100** and **65** though **79**.

PEI #3 9-15-10 DM

[✓] 4.6.12.1.1. Install 24 VDC Allen Bradley power supply tag AP241-EDS-PS-101 part #1606-XL120D on din rail and where space is available in the relay enclosure. Reference **ECN** pages **96** and **100**. AND PCN-10-000997 PAGE 28

JM6 WCH-02 9/1/10 See work Hist entry.

[✓] 4.6.12.1.2. Complete wire run to each of the new relays in the relay enclosure #1 and add TDR Coil circuit as shown on page 100 of this ECN. AND ECN-10-001073 (FCN)

NOTE- THE ZONE ALARMS LIGHTS ARE NO LONGER NEEDED,REFERENCE ECN PAGE 99.

[✓] 4.6.12.1.3. Disconnect and abandon in place relay circuits 8047, 8048 and 8049 as shown on page 100 of this ECN, do this on the similar circuits for all other tanks.

[✓] 4.6.12.1.4. Disconnect/Remove and blank off Zone alarm windows<Located on panels (TK-AP-101 through TK-AP-108).

PEI #3 9-15-10 DM

[✓] 4.6.12.1.5. Pull in and terminate existing Annulus leak detection wires to TB2 of all new LDT Enraf terminal boxes as shown on pages ~~65, 67, 69, 71, 73, 75, 77 and 79 of this ECN.~~ 3 THRU 21 OF PCN-10-000997

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

[√] 4.7. **Perform Power and Communication Wire runs from existing LIT to New Annulus Enrafs (3) per Tank as follows:**

NOTE- ENGINEERING DIMENSIONS OUTLINED IN THE ECN ARE TO BE USED AS GUIDANCE ONLY, CRAFT TO FIELD ROUTE AS REQUIRED.

Tank AP-101:

[√] 4.7.1. Install the new Annulus Enraf electrical rack as shown on pages **53, 54, 55** and **56** of this ECN adjacent to the new Annulus Enraf leak detector.

[√] 4.7.2. At the new Annulus Enraf electrical rack, fields fit and locate the 1 inch Flake Box conduit as shown on pages 55 and 56 of this ECN.

[√] 4.7.3. Field fit and reroute existing Flake Box conduit per diagram on page 41 of this ECN.

[√] 4.7.4. Field reroute all existing leak detector conduits to terminal box of all new ALD Enrafs as follows:

[√] 4.7.5. **Excavate** three trenches from the existing WST system LIT on Riser-004 to Riser-069, -070 and -071 for power and communication conduits. Field to determine trench width and depth (a minimum of 12" to top of conduit) shall be per TFC-ENG-STD-15, REV B-2 and TFC-ESHQ-S_IS-C-03, REV C-12. Trench paths shall be field determined and may be modified to avoid obstructions as shown on pages 15 through 30 of this ECN.

[√] 4.7.5.1. **Electrician** In support of excavation activities perform **monitoring** for possible **underground energized cables**.

[√] 4.7.6. Modify each existing "LIT Rack" per installation (Item153 of drawing H-2-815467) as shown on page 49 of this ECN. This modification is to add a Quazite box in front of each existing LIT terminal box to provide a place for the new underground conduits from the annulus leak detectors to land.

[√] 4.7.7. Modify the existing LIT Enraf terminal boxes (TBX-101) per Item152 of drawing H-2-815467 as shown on page 48 of this ECN to provide adequate power and communication terminals for new Enraf wiring.

[√] 4.7.8. Run wires as shown on pages 65 and 84 of this ECN. Conduits coming from new annulus LDT Enraf terminal boxes shall enter the new pull box AP101-WSTA-PBX-150 and exit to the existing LIT Enraf terminal box though two 2" conduit nipples, one for power and one for communication.

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

Power :

[✓] 4.7.9. Locate terminals 3, 6 and 10 of TB1 on AP101-WST-TBX-101, terminate WR 172 on TB1.

[✓] 4.7.10. Terminate new WR 923 from TB1 on AP101-WST-TBX-101 to TB1 on AP101-WSTA-TBX-151.

[✓] 4.7.11. Terminate new WR 925 from TB1 on AP101-WST-TBX-101 to TB1 on AP101-WSTA-TBX-152.

[✓] 4.7.12. Terminate new WR 921 from TB1 on AP101-WST-TBX-101 to TB1 on AP101-WSTA-TBX-153.

Communication:

[✓] 4.7.13. WR 385 has 8 spare pairs. Use 1 pair (**pair 7**) and label as Mod3 on both ends. Terminate WHT-7 on terminal 25 and BLK-7 on terminal 26 of TB2 in AP101-WST-TBX-101.

[✓] 4.7.14. New WR 922, label as Mod1 on both ends, terminate from TB2 on AP101-WST-TBX-101 to TB2 on AP101-WSTA-TBX-151.

[✓] 4.7.15. New WR 924, label as Mod1 on both ends, terminate from TB2 on AP101-WST-TBX-101 to TB2 on AP101-WSTA-TBX-152.

[✓] 4.7.16. New WR 920, label as Mod1 on both ends, terminate from TB2 on AP101-WST-TBX-101 to TB2 on AP101-WSTA-TBX-153.

Tank AP-102:

[✓] 4.7.17. Install the new Annulus Enraf electrical rack as shown on pages **53, 54, 55** and **57** of this ECN adjacent to the new Annulus Enraf leak detector.

[✓] 4.7.18. At the new Annulus Enraf electrical rack, field fit and locate the 1 inch Flake Box conduit as shown on pages 55 and 57of this ECN.

[✓] 4.7.19. Field fit and reroute existing Flake Box conduit per diagram on page **41** of this ECN.

[✓] 4.7.20. Field reroute all existing leak detector conduits to terminal box of all new LDT Enrafs as follows.

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

[✓] 4.7.21. **Excavate** three trenches from the existing WST system LIT on Riser-004 to Riser-069, -070 and -071 for power and communication conduits. Field to determine trench width and depth (a minimum of 12" to top of conduit) shall be per TFC-ENG-STD-15, REV B-2 and TFC-ESHQ-S_IS-C-03, REV C-12. Trench paths shall be field determined and may be modified to avoid obstructions as shown on pages 15 through 30 of this ECN.

[✓] 4.7.21.1. **Electrician** In support of excavation activities perform **monitoring** for possible **underground energized cables**.

[✓] 4.7.22. Modify each existing "LIT Rack" per installation (Item153 of drawing H-2-815467) as shown on page 49 of this ECN. This modification is to add a Quazite box in front of existing LIT terminal box to provide a place for the new underground conduits from the annulus leak detectors to land.

[✓] 4.7.23. Modify the existing LIT Enraf terminal boxes (TBX-101) per Item152 of drawing H-2-815467 as shown on page 48 of this ECN to provide adequate power and communication terminals for new Enraf wiring.

[✓] 4.7.24. Run wires as shown on pages 65, 67 and 84 of this ECN. Conduits coming from new annulus LDT Enraf terminal boxes shall enter the new pull box AP102-WSTA-PBX-150 and exit to the existing LIT Enraf terminal box though two 2" conduit nipples, one for power and one for communication.

Power:

[✓] 4.7.25. Locate terminals 3, 6 and 10 of TB1 on AP102-WST-TBX-101, terminate WR 173 on TB1.

[✓] 4.7.26. Terminate new WR 929 from TB1 on AP102-WST-TBX-101 to TB1 on AP102-WSTA-TBX-151.

[✓] 4.7.27. Terminate new WR 931 from TB1 on AP102-WST-TBX-101 to TB1 on AP102-WSTA-TBX-152.

[ ] 4.7.28. Terminate new WR 927 from TB1 on AP102-WST-TBX-101 to TB1 on AP102-WSTA-TBX-153.

Communication:

[✓] 4.7.29. WR 386 has 7 spare pairs. Use 1 pair (pair 7) and label as Mod3 on both ends. ***Terminate WHT-7 on terminal 25 and BLK-7 on terminal 26 of TB2 in AP101-WST-TBX-101*** and AP102-WST-TBX-101.

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

[✓] 4.7.30. New WR 928, label as Mod1 on both ends, terminate from TB2 on AP102-WST-TBX-101 to TB2 on AP102-WSTA-TBX-151.

[✓] 4.7.31. New WR 930, label as Mod1 on both ends, terminate from TB2 on AP102-WST-TBX-101 to TB2 on AP102-WSTA-TBX-152.

[✓] 4.7.32. New WR 926, label as Mod1 on both ends, terminate from TB2 on AP102-WST-TBX-101 to TB2 on AP102-WSTA-TBX-153.

Tank AP-103:

[✓] 4.7.33. Install the new Annulus Enraf electrical rack as shown on pages **53,54,55** and **58** of this ECN adjacent to the new Annulus Enraf leak detector.

[✓] 4.7.34. At the new Annulus Enraf electrical rack, field fit and locate the 1 inch Flake Box conduit as shown on pages **55** and **58** of this ECN.

[✓] 4.7.35. Field fit and reroute existing Flake Box conduit per diagram on page **41** of this ECN.

[✓] 4.7.36. Field reroute all existing leak detector conduits to terminal box of all new LDT Enrafs as follows.

[✓] 4.7.37. **Excavate** three trenches from the existing WST system LIT on Riser-004 to Riser-069, -070 and -071 for power and communication conduits. Field to determine trench width and depth (a minimum of 12" to top of conduit) shall be per TFC-ENG-STD-15, REV B-2 and TFC-ESHQ-S_IS-C-03, REV C-12. Trench paths shall be field determined and may be modified to avoid obstructions as shown on pages 15 through 30 of this ECN.

[✓] 4.7.37.1. **Electrician** In support of excavation activities perform **monitoring** for possible **underground energized cables**.

[✓] 4.7.38. Modify each existing "LIT Rack" per installation (Item153 of drawing H-2-815467) as shown on page 49 of this ECN. This modification is to add a Quazite box in front of existing LIT terminal box to provide a place for the new underground conduits from the annulus leak detectors to land.

[✓] 4.7.39. Modify the existing LIT Enraf terminal boxes (TBX-101) per Item152 of drawing H-2-815467 as shown on page 48 of this ECN to provide adequate power and communication terminals for new Enraf wiring.

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

[✓] 4.7.40. Run wires as shown on pages 67, 69 and 84 of this ECN. Conduits coming from new annulus LDT Enraf terminal boxes shall enter the new pull box AP103-WSTA-PBX-150 and exit to the existing LIT Enraf terminal box though two 2" conduit nipples, one for power and one for communication.

Power:

[✓] 4.7.41. Locate terminals 3, 6 and 10 of TB1 on AP103-WST-TBX-101, terminate WR 174 on TB1.

[✓] 4.7.42. Terminate new WR 935 from TB1 on AP103-WST-TBX-101 to TB1 on AP103-WSTA-TBX-151.

[✓] 4.7.43. Terminate new WR 937 from TB1 on AP103-WST-TBX-101 to TB1 on AP103-WSTA-TBX-152.

[✓] 4.7.44. Terminate new WR 933 from TB1 on AP103-WST-TBX-101 to TB1 on AP103-WSTA-TBX-153.

Communication:

[✓] 4.7.45. WR 387 has 9 spare pairs. Use 1 pair (pair 7) and label as Mod3 on both ends. ***Terminate WHT-7 on terminal 25 and BLK-7 on terminal 26 of TB2 in AP102-WST-TBX-101*** and AP103-WST-TBX-101.

[✓] 4.7.46. New WR 934, label as Mod1 on both ends, terminate from TB2 on AP103-WST-TBX-101 to TB2 on AP103-WSTA-TBX-151.

[✓] 4.7.47. New WR 936, label as Mod1 on both ends, terminate from TB2 on AP103-WST-TBX-101 to TB2 on AP103-WSTA-TBX-152.

[✓] 4.7.48. New WR 932, label as Mod3 on both ends, terminate from TB2 on AP103-WST-TBX-101 to TB2 on AP103-WSTA-TBX-153.

Tank AP-104:

[✓] 4.7.49. Install the new Annulus Enraf electrical rack as shown on pages **53,54,55** and **59** of this ECN adjacent to the new Annulus Enraf leak detector.

[✓] 4.7.50. At the new Annulus Enraf electrical rack, field fit and locate the 1 inch Flake Box conduit as shown on pages 56 through 63 of this ECN.

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

[✓] 4.7.51. Field fit and reroute existing Flake Box conduit per diagram on page **41** of this ECN.

[✓] 4.7.52. Field reroute all existing leak detector conduits to terminal box of all new LDT Enrafs as follows.

[✓] 4.7.53. **Excavate** three trenches from the existing WST system LIT on Riser-004 to Riser-069, -070 and -071 for power and communication conduits. Field to determine trench width and depth (a minimum of 12" to top of conduit) shall be per TFC-ENG-STD-15, REV B-2 and TFC-ESHQ-S_IS-C-03, REV C-12. Trench paths shall be field determined and may be modified to avoid obstructions as shown on pages 15 through 30 of this ECN.

[✓] 4.7.53.1. **Electrician** In support of excavation activities perform **monitoring** for possible **underground energized cables**.

[✓] 4.7.54. Modify each existing "LIT Rack" per installation (Item153 of drawing H-2-815467) as shown on page 49 of this ECN. This modification is to add a Quazite box in front of existing LIT terminal box to provide a place for the new underground conduits from the annulus leak detectors to land.

[✓] 4.7.55. Modify the existing LIT Enraf terminal boxes (TBX-101) per Item152 of drawing H-2-815467 as shown on page 48 of this ECN to provide adequate power and communication terminals for new Enraf wiring.

[✓] 4.7.56. Run wires as shown on pages 69, 71 and 84 of this ECN. Conduits coming from new annulus LDT Enraf terminal boxes shall enter the new pull box AP104-WSTA-PBX-150 and exit to the existing LIT Enraf terminal box though two 2" conduit nipples, one for power and one for communication.

Power:

[✓] 4.7.57. Locate terminals 3, 6 and 10 of TB1 on AP104-WST-TBX-101, terminate WR 175 on TB1.

[✓] 4.7.58. Terminate new WR 941 from TB1 on AP104-WST-TBX-101 to TB1 on AP104-WSTA-TBX-151.

[✓] 4.7.59. Terminate new WR 943 from TB1 on AP104-WST-TBX-101 to TB1 on AP104-WSTA-TBX-152.

[✓] 4.7.60. Terminate new WR 939 from TB1 on AP104-WST-TBX-101 to TB1 on AP104-WSTA-TBX-153.

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

Communication:

[✓] 4.7.61. WR 388 has 8 spare pairs. Use 1 pair (pair 7) and label as Mod3 on both ends. ***Terminate WHT-7 on terminal 25 and BLK-7 on terminal 26 of TB2 in AP103-WST-TBX-101*** and WHT-7 on terminal 21 and BLK-7 on terminal 22 of TB2 in AP104-WST-TBX-101.

[✓] 4.7.62. New WR 940, label as Mod2 on both ends, terminate from TB2 on AP104-WST-TBX-101 to TB2 on AP104-WSTA-TBX-151.

[✓] 4.7.63. New WR 942, label as Mod2 on both ends, terminate from TB2 on AP104-WST-TBX-101 to TB2 on AP104-WSTA-TBX-152.

[✓] 4.7.64. New WR 938, label as Mod2 on both ends, terminate from TB2 on AP104-WST-TBX-101 to TB2 on AP104-WSTA-TBX-153.

Tank AP-105:

[✓] 4.7.65. Install the new Annulus Enraf electrical rack as shown on pages **53,54,55** and **60** of this ECN adjacent to the new Annulus Enraf leak detector.

[✓] 4.7.66. At the new Annulus Enraf electrical rack, field fit and locate the 1 inch Flake Box conduit as shown on pages 56 through 63 of this ECN.

[✓] 4.7.67. Field fit and reroute existing Flake Box conduit per diagram on page 41 of this ECN.

[✓] 4.7.68. Field reroute all existing leak detector conduits to terminal box of all new LDT Enrafs as follows.

[✓] 4.7.69. **Excavate** three trenches from the existing WST system LIT on Riser-004 to Riser-069, -070 and -071 for power and communication conduits. Field to determine trench width and depth (a minimum of 12" to top of conduit) shall be per TFC-ENG-STD-15, REV B-2 and TFC-ESHQ-S_IS-C-03, REV C-12. Trench paths shall be field determined and may be modified to avoid obstructions as shown on pages 15 through 30 of this ECN.

[✓] 4.7.69.1. **Electrician** In support of excavation activities perform **monitoring** for possible **underground energized cables.**

[✓] 4.7.70. Modify each existing "LIT Rack" per installation (Item153 of drawing H-2-815467) as shown on page 49 of this ECN. This modification is to add a Quazite box in front of existing LIT terminal box to provide a place for the new underground conduits from the annulus leak detectors to land.

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

[✓] 4.7.71. Modify the existing LIT Enraf terminal boxes (TBX-101) per Item152 of drawing H-2-815467 as shown on page 48 of this ECN to provide adequate power and communication terminals for new Enraf wiring.

[✓] 4.7.72. Run wires as shown on pages 71, 73 and 84 of this ECN. Conduits coming from new annulus LDT Enraf terminal boxes shall enter the new pull box AP105-WSTA-PBX-150 and exit to the existing LIT Enraf terminal box though two 2" conduit nipples, one for power and one for communication.

Power:

[✓] 4.7.73. Locate terminals 3, 6 and 10 of TB1 on AP105-WST-TBX-101, terminate WR 176 on TB1.

[✓] 4.7.74. Terminate new WR 947 from TB1 on AP105-WST-TBX-101 to TB1 on AP105-WSTA-TBX-151.

[✓] 4.7.75. Terminate new WR 949 from TB1 on AP105-WST-TBX-101 to TB1 on AP105-WSTA-TBX-152.

[✓] 4.7.76. Terminate new WR 945 from TB1 on AP105-WST-TBX-101 to TB1 on AP105-WSTA-TBX-153.

Communication:

[✓] 4.7.77. WR 389 has 11spare pairs. Use 1 pair (pair 7) and label as Mod3 on both ends. ***Terminate WHT-7 on terminal 21 and BLK-7 on terminal 22 of TB2 in AP104-WST-TBX-101*** and WHT-7 on terminal 17 and BLK-7 on terminal 18 of TB2 in AP105-WST-TBX-101.

[✓] 4.7.78. New WR 946, label as Mod2 on both ends, terminate from TB2 on AP105-WST-TBX-101 to TB2 on AP105-WSTA-TBX-151.

[✓] 4.7.79. New WR 948, label as Mod2 on both ends, terminate from TB2 on AP105-WST-TBX-101 to TB2 on AP105-WSTA-TBX-152.

[✓] 4.7.80. New WR 944, label as Mod2 on both ends, terminate from TB2 on AP105-WST-TBX-101 to TB2 on AP105-WSTA-TBX-153.

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

Tank AP-106:

[✓] 4.7.81. Install the new Annulus Enraf electrical rack as shown on pages **53,54,55** and **61** of this ECN adjacent to the new Annulus Enraf leak detector.

[✓] 4.7.82. At the new Annulus Enraf electrical rack, field fit and locate the 1 inch Flake Box conduit as shown on pages **53,54,55** and **59** of this ECN.

[✓] 4.7.83. Field fit and reroute existing Flake Box conduit per diagram on page **41** of this ECN.

[✓] 4.7.84. Field reroute all existing leak detector conduits to terminal box of all new LDT Enrafs as follows.

[✓] 4.7.85. **Excavate** three trenches from the existing WST system LIT on Riser-004 to Riser-069, -070 and -071 for power and communication conduits. Field to determine trench width and depth (a minimum of 12" to top of conduit) shall be per TFC-ENG-STD-15, REV B-2 and TFC-ESHQ-S_IS-C-03, REV C-12. Trench paths shall be field determined and may be modified to avoid obstructions as shown on pages 15 through 30 of this ECN.

[✓] 4.7.85.1. **Electrician** In support of excavation activities perform **monitoring** for possible **underground energized cables**.

[✓] 4.7.86. Modify each existing "LIT Rack" per installation (Item153 of drawing H-2-815467) as shown on page 49 of this ECN. This modification is to add a Quazite box in front of existing LIT terminal box to provide a place for the new underground conduits from the annulus leak detectors to land.

[✓] 4.7.87. Modify the existing LIT Enraf terminal boxes (TBX-101) per Item152 of drawing H-2-815467 as shown on page 48 of this ECN to provide adequate power and communication terminals for new Enraf wiring.

[✓] 4.7.88. Run wires as shown on pages 73, 75 and 84 of this ECN. Conduits coming from new annulus LDT Enraf terminal boxes shall enter the new pull box AP106-WSTA-PBX-150 and exit to the existing LIT Enraf terminal box though two 2" conduit nipples, one for power and one for communication.

Power:

[✓] 4.7.89. Locate terminals 3, 6 and 10 of TB1 on AP106-WST-TBX-101, terminate WR 177 on TB1.

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

[✓] 4.7.90. Terminate new WR 953 from TB1 on AP106-WST-TBX-101 to TB1 on AP106-WSTA-TBX-151.

[✓] 4.7.91. Terminate new WR 955 from TB1 on AP106-WST-TBX-101 to TB1 on AP106-WSTA-TBX-152.

[✓] 4.7.92. Terminate new WR 951 from TB1 on AP106-WST-TBX-101 to TB1 on AP106-WSTA-TBX-153.

Communication:

[✓] 4.7.93. WR 390 has 10 spare pairs. Use 1 pair (pair 7) and label as Mod3 on both ends. ***Terminate WHT-7 on terminal 17 and BLK-7 on terminal 18 of TB2 in AP105-WST-TBX-101*** and WHT-7 on terminal 19 and BLK-7 on terminal 21 of TB2 in AP106-WST-TBX-101.

[✓] 4.7.94. New WR 952, label as Mod2 on both ends, terminate from TB2 on AP106-WST-TBX-101 to TB2 on AP106-WSTA-TBX-151.

[✓] 4.7.95. New WR 954, label as Mod3 on both ends, terminate from TB2 on AP106-WST-TBX-101 to TB2 on AP106-WSTA-TBX-152.

[✓] 4.7.96. New WR 950, label as Mod3 on both ends, terminate from TB2 on AP106-WST-TBX-101 to TB2 on AP106-WSTA-TBX-153.

Tank AP-107:

[✓] 4.7.97. Install the new Annulus Enraf electrical rack as shown on pages **53,54,55** and **62** of this ECN adjacent to the new Annulus Enraf leak detector.

[✓] 4.7.98. At the new Annulus Enraf electrical rack, field fit and locate the 1 inch Flake Box conduit as shown on pages **53,54,55** and **62** of this ECN.

[✓] 4.7.99. Field fit and reroute existing Flake Box conduit per diagram on page **41** of this ECN.

[✓] 4.7.100. Field reroute all existing leak detector conduits to terminal box of all new ALD Enrafs as follows.

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

[ ] 4.7.101. **Excavate** three trenches from the existing WST system LIT on Riser-004 to Riser-069, -070 and -071 for power and communication conduits. Field to determine trench width and depth (a minimum of 12" to top of conduit) shall be per TFC-ENG-STD-15, REV B-2 and TFC-ESHQ-S_IS-C-03, REV C-12. Trench paths shall be field determined and may be modified to avoid obstructions as shown on pages 15 through 30 of this ECN.

[ ] 4.7.101.1. **Electrician** In support of excavation activities perform **monitoring** for possible **underground energized cables**.

[ ] 4.7.102. Modify each existing "LIT Rack" per installation (Item153 of drawing H-2-815467) as shown on page 49 of this ECN. This modification is to add a Quazite box in front of existing LIT terminal box to provide a place for the new underground conduits from the annulus leak detectors to land.

[ ] 4.7.103. Modify the existing LIT Enraf terminal boxes (TBX-101) per Item152 of drawing H-2-815467 as shown on page 48 of this ECN to provide adequate power and communication terminals for new Enraf wiring.

[ ] 4.7.104. Run wires as shown on pages 75, 77 and 84 of this ECN. Conduits coming from new annulus LDT Enraf terminal boxes shall enter the new pull box AP107-WSTA-PBX-150 and exit to the existing LIT Enraf terminal box though two 2" conduit nipples, one for power and one for communication.

[ ] 4.7.105. Locate terminals 3, 6 and 10 of TB1 on AP107-WST-TBX-101, terminate WR 178 on TB1.

[ ] 4.7.106. Terminate new WR 959 from TB1 on AP107-WST-TBX-101 to TB1 on AP107-WSTA-TBX-151.

[ ] 4.7.107. Terminate new WR 961 from TB1 on AP107-WST-TBX-101 to TB1 on AP107-WSTA-TBX-152.

[ ] 4.7.108. Terminate new WR 957 from TB1 on AP107-WST-TBX-101 to TB1 on AP107-WSTA-TBX-153.

Communication:

[ ] 4.7.109. WR 391 has 11 spare pairs. Use 1 pair (pair 7) and label as Mod3 on both ends. ***Terminate WHT-7 on terminal 19 and BLK-7 on terminal 21 of TB2 in AP106-WST-TBX-101*** and WHT-7 on terminal 19 and BLK-7 on terminal 21 of TB2 in AP107-WST-TBX-101.

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

[✓] 4.7.110. New WR 958, label as Mod3 on both ends, terminate from TB2 on AP107-WST-TBX-101 to TB2 on AP107-WSTA-TBX-151.

[✓] 4.7.111. New WR 960, label as Mod3 on both ends, terminate from TB2 on AP107-WST-TBX-101 to TB2 on AP107-WSTA-TBX-152.

[✓] 4.7.112. New WR 956, label as Mod3 on both ends, terminate from TB2 on AP107-WST-TBX-101 to TB2 on AP107-WSTA-TBX-153.

Tank AP-108:

[✓] 4.7.113. Install the new Annulus Enraf electrical rack as shown on pages **53,54,55** and **63** of this ECN adjacent to the new Annulus Enraf leak detector.

[✓] 4.7.114. At the new Annulus Enraf electrical rack, field fit and locate the 1 inch Flake Box conduit as shown on pages **53,54,55** and **63** of this ECN.

[✓] 4.7.115. Field fit and reroute existing Flake Box conduit per diagram on page **41** of this ECN.

[✓] 4.7.116. Field reroute all existing leak detector conduits to terminal box of all new ALD Enrafs as follows.

[✓] 4.7.117. **Excavate** three trenches from the existing WST system LIT on Riser-004 to Riser-069, -070 and -071 for power and communication conduits. Field to determine trench width and depth (a minimum of 12" to top of conduit) shall be per TFC-ENG-STD-15, REV B-2 and TFC-ESHQ-S_IS-C-03, REV C-12. Trench paths shall be field determined and may be modified to avoid obstructions as shown on pages 15 through 30 of this ECN.

[✓] 4.7.117.1. **Electrician** In support of excavation activities perform **monitoring** for possible **underground energized cables**.

[✓] 4.7.118. Modify each existing "LIT Rack" per installation (Item153 of drawing H-2-815467) as shown on page 49 of this ECN. This modification is to add a Quazite box in front of existing LIT terminal box to provide a place for the new underground conduits from the annulus leak detectors to land.

[✓] 4.7.119. Modify the existing LIT Enraf terminal boxes (TBX-101) per Item152 of drawing H-2-815467 as shown on page 48 of this ECN to provide adequate power and communication terminals for new Enraf wiring.

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

[✓] 4.7.120. Run wires as shown on pages 77, 79 and 84 of this ECN. Conduits coming from new annulus LDT Enraf terminal boxes shall enter the new pull box AP108-WSTA-PBX-150 and exit to the existing LIT Enraf terminal box though two 2" conduit nipples, one for power and one for communication.

Power:

[✓] 4.7.121. Locate terminals 3, 6 and 10 of TB1 on AP108-WST-TBX-101, terminate WR 179 on TB1.

[✓] 4.7.122. Terminate new WR 965 from TB1 on AP108-WST-TBX-101 to TB1 on AP108-WSTA-TBX-151.

[✓] 4.7.123. Terminate new WR 967 from TB1 on AP108-WST-TBX-101 to TB1 on AP108-WSTA-TBX-152.

[✓] 4.7.124. Terminate new WR 963 from TB1 on AP108-WST-TBX-101 to TB1 on AP108-WSTA-TBX-153.

Communication:

[✓] 4.7.125. WR 392 has 10 spare pairs. Use 1 pair (pair 7) and label as Mod3 on both ends. ***Terminate WHT-7 on terminal 19 and BLK-7 on terminal 22 of TB2 in AP107-WST-TBX-101*** and WHT-7 on terminal 19 and BLK-7 on terminal 21 of TB2 in AP108-WST-TBX-101.

[✓] 4.7.126. New WR 964, label as Mod3 on both ends, terminate from TB2 on AP108-WST-TBX-101 to TB2 on AP108-WSTA-TBX-151.

[✓] 4.7.127. New WR 966, label as Mod3 on both ends, terminate from TB2 on AP108-WST-TBX-101 to TB2 on AP108-WSTA-TBX-152.

[✓] 4.7.128. New WR 962, label as Mod3 on both ends, terminate from TB2 on AP108-WST-TBX-101 to TB2 on AP108-WSTA-TBX-153.

[✓] 4.8. Contact engineering to perform ECN sign off.

[✓] 4.9. Remove lock and tag.

P.I. #4 1-23-10 DM

[✓] 4.10 PROGRAM ENRAF ALARM CONTACTS, USING ATTACHED VTM VENDOR INFORMATION TO SUPPORT DESIRED ALARM RESPONSE.

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

5.0 POST-ACTIVITY/MAINTENANCE TESTING

[ ] 5.1. Power up the CIU and Enraf (s) gages perform functional test per attached DL# and PM data sheets

[ ] 5.2. Compare with T-Mac operator the readings between gauge and TMACS should be (0.02 differences).

[ ] 5.3. Perform Functional checkout of the manual Transfer switch using alternate power source, Verify that Enraf , CIU ~~and TMACS~~ are communicating. 9/23/10

6.0 RESTORATION ACTIONS

[✓] 6.1. Job Site Cleanup

[✓] 6.1.1. ~~HPT~~ perform post-job survey.

WTP-001298 / 9/26/10 WTP-001298

Signature DATE Survey #

[✓] 6.1.2. FWS ensure the job site has been cleaned up and all waste has been placed in the proper containers per Waste Planning Checklist, as necessary.

[✓] 6.1.3. System Engineer (Bob Nicholson or designee) update the permanent Dome Load Record following completion of this work package.

[✓] 6.1.4. System Engineer (Bob Nicholson or designee) contact Projects and Maintenance Engineering to update PM's and initial calibration date of new equipment. D Bruggs 09/28/10

[ ] 6.1.5. FWS to review work package for trends and lessons learned. Conduct a Post Job Review on all fieldwork, marking "X" in Feedback block, where appropriate.

Closeout Review.

Attachment 2-2

WRPS WORK RECORD

Document Number: TFC-WO-10-1375

2. Work Item Title: 241-AP Install ENRAF Assemblies

Date	Turnover, Problem Description, Action Taken	Feed Back (X)	Name	Craft/ Resource Type	Hours
6/23/10	STEP 3.12 REMOVE CIRCUIT	X	[signature]	Plmr.	
PEN/INK	14. IT WILL BE INSTALLED AT	/	[signature]	FWS	
	A LATER DATE. ALSO 3.13		[signature]	AP/AW SM	
	REMOVED LOCK OUT. FOR THE INSTRUMENT				
	AIR, IT IS ALREADY ISOLATED FOR				
	OPERATIONS.				
6/23/10	E.T. WAS INSTALLED ON CIRCUIT				
	11 IN PACKAGE TFC-WO-D-1375				
	ALL 8 FLAKE BOXES ON RISER 091				
	HAVE BEEN DISCONNECTED, READY				
	FOR MANUAL READINGS WITHIN				
	FARM.		[signature]		
6/24/10	CUT GASKETS AND TURNED				
	BACK TO NATURAL CORD,				
	WAITING FOR MATERIAL ISSUING				
	IN ORDER TO CONTINUE WITH				
	FIELD REMOVAL / INSTALL		[signature]		
→	2) 4x4x8 BOXES / 24 DRUMS?				
6/28	HELD PRE JOB. HELD WALKDOWN W/CRAFTS		Hay.		
	AND BEGAN GETTING MATERIAL TOGETHER				
	PLAN ON BEGIN REMOVAL OF FLAKE BOXES				
	TOMORROW.				
6/29	HELD PRE JOB. REMOVED FLAKE BOXES				
	HOUSINGS FROM TANKS 101 BUX				
	108 RISERS 69 & 70 - 16 TOTAL. ALL				
	HOUSINGS SURVEYED CLEAN ON REMOVAL.				
	WILL BEGIN REMOVAL OF SHIELD & PIPING				
	TUBE FROM RISER TOMORROW		[signature]		

Work History (and ISMS Feedback) Review Results: **Lessons Learned Needed? YES / NO** (circle one)

Reviewed By:

Work Control Center

Print/Type Name _____ Signature _____ Date _____

WRPS WORK RECORD

Document Number: TFC-WO-10-1378

2. Work Item Title: 241-AP Install ENRAF Assemblies

Date	Turnover, Problem Description, Action Taken	Feed Back (X)	Name	Craft/ Resource Type	Hours
6/30	Removed all lines from AP-101 thru AP-108 riser 069 and 070. and installed ball valves. Found liner on AP-105 riser 069 about 4' short. Informed Shift and supervision. Job site clean, no waste. Plan on starting building of enrafs tomornow.		Hay		
7/1	Held prejob. Installed remaining bolts on ball valves. Job site clean no waste		Hay		
7/2/10	Held pre-job. From step 4.2.3 thru to the end of work steps within package. No lock & tag is required to stack and calibrate new Annulus enraf units STEP 4.2.3 ON RELEASED TO WORK		[illegible]	625	
			[illegible]	SM	
7/2/10	Installed flush port spool assembly and sight glass assemblies at tanks AP101 & 102 risers 69 & 70. Torqued All bolts to 65 ft lbs as stated listed items using 817-88-01-009 due 11/5/10. No waste		[illegible]		
7/6	Installed sight Glasses and spool pieces on AP-108, AP-106 and AP-104		HG		

Work History (and ISMS Feedback) Review Results: **Lessons Learned Needed? YES / NO** (circle one)

Reviewed By:

Work Control Center

Print/Type Name _____ Signature _____ Date _____

A-6003-243 (REV 1)

WRPS WORK RECORD

Document Number: TFC-WO-10-1378

2. Work Item Title: 241-AP Install ENRAF Assemblies

Date	Turnover, Problem Description, Action Taken	Feed Back (X)	Name	Craft/ Resource Type	Hours
7/7	Completed installation of Spool pieces and sight glasses on first 16 TANKS		Hay		
7/12	Mounted 16 enrafs to nisers, plan on installing labels tomorrow.				
7/13	Installing labels today may need to rotate a few enrafs due to stand placement.		Hay		
7/15/10					
PEN/INK	Made pen/ink change TO STEP 4.4.1 TO ADD And ADDITIONAL procedure 6-600-485 For the POST INSTALLATION /CALIBRATION SETTINGS. Received pen-Telecon APPROVALS from Engineering DAVE BARNES MCR STEP 4.11.9.		Pen-Telecon CRAIG D WALLIN JMH per Telecon DAVE BARNES	SHIFT M. FWS Eng	
			Mark Trent	S&H	
			Joseph	Plant	
7/15	Instrument Techs are beginning to install Drum/Displacers on Even number tanks.		Hay		
7/16	Installed Drums/Displacer on all even units.		Hay		
7/24	Repositioned odd enrafs to agree with stand locations		Hay		

Work History (and ISMS Feedback) Review Results: **Lessons Learned Needed? YES / NO** (circle one)

Reviewed By:

Work Control Center

Print/Type Name *Signature* *Date*

WRPS WORK RECORD

Document Number: TFC-WO-10-1378

2. Work Item Title: 241-AP Install ENRAF Assemblies

Date	Turnover, Problem Description, Action Taken	Feed Back (X)	Name	Craft/ Resource Type	Hours
7/25	Installed Drum/Displacers on all odd enrafs.		Hay		
7/29	Attempted to program units for ALD app. need to add addition work steps before continuing.		Hay		
8/1/10	Performed procedure 6-COD-485 for AP-102 and AP-104 and completed data sheets		Hay		
8/3	Installed Drum/Displacer in AP-101, 103, 105 and 107. Also install Inst ID labels		Hay		
8/5	Performed enraf setup procedure on remaining AP Enraf and completed data sheet.		Hay.		
8/11	Annulus ENRAFS on Riser CE-9 and 071 accepted for ~~use~~ 1st TM/16 use by Operations.		J. Alms		
8/15	Install enrafs on riser 071 on all tanks except AP-101. Also installed Drum/Displacer except on AP-101, 105 and 107.		Hay		
8/16	Rotated AP-105 and AP-107 to allow flex directshot. Built up AP-101. Installed All-153 labels today		Hay		

Work History (and ISMS Feedback) Review Results: **Lessons Learned Needed? YES / NO** (circle one)

Reviewed By:

Work Control Center

Print/Type Name *Signature* *Date*

WRPS WORK RECORD

1. Document Number: TFC-WO-10-1378

2. Work Item Title: 241-AP Install ENRAF Assemblies

Date	Turnover, Problem Description, Action Taken	Feed Back (X)	Name	Craft/ Resource Type	Hours
8/17	installed remaining drum/displacers performed calibration on all -153 gauges.		Hay		
9/28/10	PM data sheets updated to reflect last done & next due dates. Used same last done date for the LDT-153 gauges as for their respective LDT-151 & LDT-152 dates for consistency. This is conservative (last done 08/01 for AP102 & AP-104; 08/05 for remaining ENRAFS)		D Bragg	Eng.	
9/28/10	Procedure 3-LDD-629 inactivated Done load record updated. Data sheets updated.		RJN Robert Nicholson	9/28/10	

Work History (and ISMS Feedback) Review Results: **Lessons Learned Needed? YES / NO** (circle one)

Reviewed By:

Work Control Center

Print/Type Name *Signature* *Date*

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

1.0 SCOPE:

- 241-AP Annulus, This work package will install (**24**) Enraf ALD's (**3 per tank**) on Annulus Risers (069), (070) and (071) Per ECN# 726946 for AP-101 through AP-108. This will be performed in the following order while **supporting operation in continuous monitoring** for leaks in the annulus. Project will perform this work as follows:
  - 241-AP **Remove** (**16**) existing Flake boxes (Manual tapes) on annulus Risers (**2 per tank**). Remove liner and Shield plugs and cap off **16** associated **airlines**. These following existing 16 Flake boxes (Manual tapes) **will be taken out of service**.
    - AP101-WSTA-LIS-121C (069) AP101-WSTA-LIS-121A (070) AP102-WSTA-LIS-122B (069) AP102-WSTA-LIS-122A (070) AP103-WSTA-LIS-123C (069) AP103-WSTA-LIS-123A (070) AP104-WSTA-LIS-124B (069) AP104-WSTA-LIS-124A (070) AP105-WSTA-LIS-125C (069) AP105-WSTA-LIS-125B (070) AP106-WSTA-LIS-126A (069) AP106-WSTA-LIS-126B (070) AP107-WSTA-LIS-127C (069) AP107-WSTA-LIS-127B (070) AP108-WSTA-LIS-128A (069 AP108-WSTA-LIS-128B (070)
    - 241-AP **Install** 16 **new Enraf** ALD,on annulus Risers (2 per tank), Install new ball valves, flush ports and sight glasses. Temporarily connect Electrical pigtails, calibrate and field test. **Operations Acceptance of new component as operational.**
    - AP101-WSTA-LDT-151 (069) AP101-WSTA-LDT-152 (070) AP102-WSTA-LDT-151 (069) AP102-WSTA-LDT-152 (070) AP103-WSTA-LDT-151 (069) AP103-WSTA-LDT-152 (070) AP104-WSTA-LDT-151 (069) AP104-WSTA-LDT-152 (070) AP105-WSTA-LDT-151 (069) AP105-WSTA-LDT-152 (070) AP106-WSTA-LDT-151 (069) AP106-WSTA-LDT-152 (070) AP107-WSTA-LDT-151 (069) AP107-WSTA-LDT-152 (070) AP108-WSTA-LDT-151 (069) AP108-WSTA-LDT-152 (070)
    - 241-AP **Remove** 8 Existing Flake boxes (manual tapes) on annulus Risers (1 per tank). Remove liner and Shield plugs. And cap off 8 airlines. The following existing 8 Flake boxes (Manual tapes) **will be taken out of service**.
    - AP101-WSTA-LIS-121B (071) AP102-WSTA-LIS-122C (071) AP103-WSTA-LIS-123B (071) AP104-WSTA-LIS-124C (071) AP105-WSTA-LIS-125A (071) AP106-WSTA-LIS-126C (071) AP107-WSTA-LIS-127A (071) AP108-WSTA-LIS-128C (071)
    - 241-AP **Install** 8 new Enraf ALD,on annulus Risers (1 per tank), Install new ball valves, flush ports and sight glass. Temporarily connect via pigtails, calibrate and field test. **Operations Acceptance of new component as operational.**
    - AP101-WSTA-LDT-153 (071) AP102-WSTA-LDT-153 (071) AP103-WSTA-LDT-153 (071) AP104-WSTA-LDT-153 (071) AP105-WSTA-LDT-153 (071) AP106-WSTA-LDT-153 (071) AP107-WSTA-LDT-153 (071) AP108-WSTA-LDT-153 (071)

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

2.0 LIMITATIONS & PRECAUTIONS

[ ] 2.1. System Engineer has identified the system to be worked on as General Service (GS).

[ ] 2.2. Per Tank Farms AHERA Planner, The existing gaskets on the 241-AP-101 through -241-AP-108, risers 069, 070 and 071 has been verified as **Non-Asbestos** and will not require asbestos abatement.

[ ] 2.3. Physical restraints shall be used to prevent accidentally dropping objects into the tank. This applies to objects used above the plane of the open riser.

[ ] 2.4. For manual lifts, a minimum of two people or material handling aids shall be used for lifts over 40 lbs.

[ ] 2.5. All hoisting and rigging activities shall comply with the requirements of the Hanford Hoisting & Rigging Manual (DOE-RL-92-36):

[ ] 2.5.1. Facility manager has determined that equipment to lifted will be designated as a General lift per the following estimated weight of the equipment being removed and installed.

[ ] 2.5.1.1. Estimated **weight** of the **shield plugs** attached to the **Kynar liner** is **94lbs**. If the shield plug can be removed separately from the Kynar pipe liner and the liner can be broke loose from the riser flange then the 2 man rule will apply and the lift will be designated as a general lift.

[ ] 2.6. If sustained **winds** greater than **25 mph** and/or Gusts greater than 40 mph, all crane operations must be secured.

[ ] 2.7. **RWP TF-100** (latest rev.) will be used for this work activity.

[ ] 2.8. Documented Radiological surveys are required for opening potentially contaminated systems or items, accessing previously unexposed surfaces, excavating or when otherwise required by procedure.

[ ] 2.8.1. HPT to perform radiological survey of shield plug and/or kynar liner as they are being removed to verify the surface of the item or the outermost surface of the container are maintained <1000 dpm/100 cm2 beta/gamma and/or <20 dpm/200 cm2 alpha.

[ ] 2.8.2. If contamination levels are above the limits, Notify Radcon FLM and SME for path forward.

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

3.0 PREREQUISITES:

[ ] 3.1. Conduct a **Pre-Job Briefing**.

[ ] 3.1.1. A pre-job briefing MUST BE performed prior to any pre-requisite work activities or fieldwork. See Lessons Learn in work package.

NOTE- STEPS (3.2) THROUGH (3.13) MAY BE WORKED CONCURRENTLY OR IN ANY ORDER AS DRECTED BY FWS.

[ ] 3.2. Ensure materials to perform this activity are staged and ready for use.

[ ] 3.3. Prepare equipment lay down area (e.g. dunnage, additional plastic) for removed equipment.

[ ] 3.4. Ensure appropriate numbers of spotters are assigned for all vehicle movement inside the tank farm boundary and follow the route map, when applicable.

[ ] 3.5. Ensure that the rigging equipment and materials have the required capacity for the job and that all items are in good condition, are currently qualified (inspection is up to date), and are properly used.

[ ] 3.6. Confirm that the load path is clear of personnel and obstacles.

NOTE- AT THIS POINT THE GAUGES SHOULD HAVE A GREEN "QC" ACCEPTANCE TAG ON IT.

[ ] 3.7. Work package TFC-WO-10-1389, Ensure the shop ATP (s) (HNF-SD-WM-ATP-077) has been successfully performed on the Enraf gauges to be installed prior to transport to the field.

[ ] 3.7.1. Ensure the window gasket(s) in the Enraf ALD Sight Glasses has a Garlock 3000 type gasket prior to transporting the sight glass assembly to the field.

[ ] 3.7.2. Tighten window housing(s) using good mechanical judgment.

[ ] 3.7.3. Ensure the 1/4" quick disconnect (ref. H-2-817634, sh 1, item #14) has been installed onto the Enraf drum housing.

[ ] 3.7.4. Ensure prior to transporting the Enraf ALD gauges to the field for installation all shipping plugs/dust covers have been removed and un-used ports replaced with metal plugs.

[ ] 3.8. FWS to review the Waste Planning Checklist for handling and disposal of any waste generated. Contact Generator Services-Operating Facilities for container request forms.

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

[ ] 3.9. Ensure that all vehicles that enter the farm for this activity have current ignition source control approval stickers and spotters / flagmen (2 minimum).

[ ] 3.10. FWS ensure that the Dome Load Vehicle Route map is approved and in the work package.

[ ] 3.10.1. The exclusion zone (Ex-Tank region) around the riser will be 6' diameter radius (for a 4" riser.).

Shift Operation manager

[✓] 3.11. **Ensure** that work package **TFC-WO-10-1379** has disconnected the following manual tapes to **support operations in continuous monitoring for leaks** in the **Annulus** for tanks AP-101 through AP-108.

- AP**101**-WSTA-LIS-121B (071) AP**102**-WSTA-LIS-122C (071) AP**103**-WSTA-LIS-123B (071 AP**104**-WSTA-LIS-124C (071) AP**105**-WSTA-LIS-125A (071) AP**106**-WSTA-LIS-126C (071) AP**107**-WSTA-LIS-127A (071) AP**108**-WSTA-LIS-128C (071)

RW Dean / 6/23/10
FWS SIGNATURE DATE

Pen/ink see work cont 6/23/10 JAK

[✓] 3.12. **Ensure** work package TFC-WO-10-1379 has installed **lock and tag** AP271-EDS-DP-101, Circuits 11 ~~and 14~~, for the following components.

AP101-WSTA-LIS-121C (069) AP101-WSTA-LIS-121A (070) AP102-WSTA-LIS-122B (069) AP102-WSTA-LIS-122A (070) AP103-WSTA-LIS-123C (069) AP103-WSTA-LIS-123A (070) AP104-WSTA-LIS-124B (069) AP104-WSTA-LIS-124A (070) AP105-WSTA-LIS-125C (069) AP105-WSTA-LIS-125B (070) AP106-WSTA-LIS-126A (069) AP106-WSTA-LIS-126B (070) AP107-WSTA-LIS-127C (069) AP107-WSTA-LIS-127B (070) AP108-WSTA-LIS-128A (069 AP108-WSTA-LIS-128B (070).

Pen/ink re work cont. JAK

[✓] 3.13. ~~Lock out~~/Turn off instrument air supply. (Service Air isolation valve AP273-IA-V-123, ref. dwg# H-14-020303, sheet. 2.

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

4.0 SPECIFIC WORK INSTRUCTIONS

NOTE- STEPS 4.1 THROUGH 4.5 AND THEIR SUB STEPS MAY BE WORKED CONCURRENTLY, IN ANY ORDER OR IN PARALLEL, AS DIRECTED BY THE FWS.

[✓] 4.1. **Remove (16)** existing Flake boxes (Manual tapes) on annulus Risers (**2 per tank**). Remove liner and Shield plugs and cap off **16** associated **airlines** per the following work instructions and **ECN-726946** pages **7 and 31 through 33**.

[✓] 4.1.1. HPT perform pre-job survey. Document RSR # on the Work Record.

[✓] 4.1.2. Disconnect the instrument air line tubing from Flake box (manual tape).

[✓] 4.1.2.1. Remove Valves and Cap/plug the air supply tubing per **ECN-726946** pages **7 and 31 through 33**.

[✓] 4.1.3. Place ground cover(s) around the riser(s) prior to opening, as required.

[✓] 4.1.4. Remove the Flake box (manual tapes) assembly and associated components per **ECN-726946** pages **7, 34 through 36,** and the following work steps.

[✓] 4.1.4.1. Remove the existing gasket.

[✓] 4.1.4.2. Dispose of riser flange and bolts per in accordance with the Waste Planning Checklist.

[✓] 4.1.4.3. If required, install a temporary PVC Blind flange (pancake)

[✓] 4.1.5. Remove **5 foot shield plug** from riser as directed by field work supervisor and the following steps:

[✓] 4.1.5.1. Dispose of Shield plug in accordance with the Waste Planning Checklist.

[✓] 4.1.6. Remove **25 foot Kynar liner** as directed by field work supervisor and the following steps:

[✓] 4.1.6.1. Dispose of Kynar in accordance with the Waste Planning Checklist.

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

[✓] 4.1.7. **FWS** to **initial** and **date** below the completed Tank (**16**) **manual tape removal** per the above work steps: Repeat above work steps for the following additional components/risers.

- AP101-WSTA-LIS-121C (069) JMH / 6/30/10 (FWS initial / Date)
- AP101-WSTA-LIS-121A (070) JMH / 6/30/10
- AP**102**-WSTA-LIS-122B (069) JMH / 6/30/10
- AP102-WSTA-LIS-122A (070) JMH / 6/30/10
- AP**103**-WSTA-LIS-123C (069) JMH / 6/30/10
- AP103-WSTA-LIS-123A (070) JMH / 6/30/10
- AP**104**-WSTA-LIS-124B (069) JMH / 6/30/10
- AP104-WSTA-LIS-124A (070) JMH / 6/30/10
- AP**105**-WSTA-LIS-125C (069) JMH / 6/30/10
- AP105-WSTA-LIS-125B (070) JMH / 6/30/10
- AP**106**-WSTA-LIS-126A (069) JMH / 6/30/10
- AP106-WSTA-LIS-126B (070) JMH / 6/30/10
- AP**107**-WSTA-LIS-127C (069) JMH / 6/30/10
- AP107-WSTA-LIS-127B (070) JMH / 6/30/10
- AP**108**-WSTA-LIS-128A (069) JMH / 6/30/10
- AP108-WSTA-LIS-128B (070) JMH / 6/30/10

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

Install 16 new Enraf ALD:

[✓] 4.2. Install (**16**) new ENRAFs (ALDs) on annulus Risers (**2 per tank**) per the following work steps and **ECN** page **5, 7, 14** and drawing H-2-817634 assembly -010. These Enrafs have been pre marked for riser location.

[✓] 4.2.1. Install the new gasket & ball valve on riser and **ensure** the new 4" ball valve is in the **closed position**.

[✓] 4.2.2. Tighten fasteners (at least two).

Note that riser survey benchmark shall be vertically clear.

[✓] 4.2.3. Install ENRAF mechanical assemblies to the riser. The Enraf displays (**Gauge**) ideally shall **face North** and if they are blocking the benchmark, they should be rotated as few bolt holes as needed to provide clearance above the benchmark.

[✓] 4.2.4. **FWS** Perform **verification** that the **slot** in the **adapter flange** (ref. dwg. # H-2-817634, P/N 15) **is parallel** to the **Enraf wire travel direction** (parallel to the longitudinal axis of the electronics housing).

- AP101-WSTA-LDT-151 (069) JMU / 7/12/10 (FWS initial / Date)
- AP101-WSTA-LDT-152 (070) JMU / 7/12/10 (FWS initial / Date)
- AP102-WSTA-LDT-151 (069) JMU / 7/12/10 (FWS initial / Date)
- AP102-WSTA-LDT-152 (070) JMU / 7/12/10 (FWS initial / Date)
- AP103-WSTA-LDT-151 (069) JMU / 7/12/10 (FWS initial / Date)
- AP103-WSTA-LDT-152 (070) JMU / 7/12/10 (FWS initial / Date)
- AP104-WSTA-LDT-151 (069) JMU / 7/12/10 (FWS initial / Date)
- AP104-WSTA-LDT-152 (070) JMU / 7/12/10 (FWS initial / Date)
- AP105-WSTA-LDT-151 (069) JMU / 7/12/10 (FWS initial / Date)
- AP105-WSTA-LDT-152 (070) JMU / 7/12/10 (FWS initial / Date)
- AP106-WSTA-LDT-151 (069) JMU / 7/12/10 (FWS initial / Date)
- AP106-WSTA-LDT-152 (070) JMU / 7/12/10 (FWS initial / Date)
- AP107-WSTA-LDT-151 (069) JMU / 7/12/10 (FWS initial / Date)
- AP107-WSTA-LDT-152 (070) JMU / 7/12/10 (FWS initial / Date)
- AP108-WSTA-LDT-151 (069) JMU / 7/12/10 (FWS initial / Date)
- AP108-WSTA-LDT-152 (070) JMU / 7/12/10 (FWS initial / Date)

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

NOTE- STEP 4.2.5 REQUIRES THE USE OF THE FOLLOWING EQUIPMENT, TORQUE WRENCH/DRIVER, RECOMMENTED ALL MODEL ***ALL, CALIBRATED.**

[✓] 4.2.5. Ensure required torque readings on the flange bolts are per the following. (Ref. dwg# H-2-817634, notes 4 for 2" & 4")

2" flange gasket (garlock 3000 type): 52-76 ft. lbs.

4" flange gasket (garlock 3000 type): 63-70 ft. lbs.

M&TE#: 817-88-01-029 Cal. Due Date: 11-05-10

[✓] 4.2.6. **Ensure** applicable **I.D. tags** are installed per ECN# 726946, page 6.

[✓] 4.2.7. **FWS** to **initial** and **date** below the completed Tank **ENRAF installation** per the above work steps: Repeat above work steps for the following ENRAFS.

- AP101-WSTA-LDT-151 (069) JMH / 8/5/10 (FWS initial / Date)
- AP101-WSTA-LDT-152 (070) JMH / 8/5/10
- AP102-WSTA-LDT-151 (069) JMH / 8/1/10
- AP102-WSTA-LDT-152 (070) JMH / 8/1/10
- AP103-WSTA-LDT-151 (069) JMH / 8/6/10
- AP103-WSTA-LDT-152 (070) JMH / 8/6/10
- AP104-WSTA-LDT-151 (069) JMH / 8/1/10
- AP104-WSTA-LDT-152 (070) JMH / 8/1/10
- AP105-WSTA-LDT-151 (069) JMH / 8/5/10
- AP105-WSTA-LDT-152 (070) JMH / 8/6/10
- AP106-WSTA-LDT-151 (069) JMH / 8/1/10
- AP106-WSTA-LDT-152 (070) JMH / 8/1/10
- AP107-WSTA-LDT-151 (069) JMH / 8/5/10
- AP107-WSTA-LDT-152 (070) JMH / 8/6/10
- AP108-WSTA-LDT-151 (069) JMH / 8/5/10
- AP108-WSTA-LDT-152 (070) JMH / 8/5/10

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

NOTE- STEP **4.3** IF POWER IS NOT AVAILABLE, A PORTABLE GENERATORMAY BE USED. PERMANENT POWER WILL BE INSTALLED LATER IN WORK PACKAGE TFC-WO-10-1379.

[✓] 4.3. Connect temporary power to the Enraf ALD via an extension cord with GFI, if required.

[✓] **4.4.** Perform post installation calibration/initial settings on Enraf ALDs per Procedure 5-LCD-125 and the following work steps. **Enraf Addresses in ECN-726946 page 13.**

JA 1/6 PW / INK 7/15/10 see work record

[✓] 4.4.1 5-LCD-125 Change Enraf settings to (AH=02),(LA:0) AND (LL=0). Then Perform 6-LDD-485 Appropreate steps with initial PM DATASheets.

Table 1: Enraf Addresses

MODULE	ADDRESS	ENRAF TAG		MODULE	ADDRESS	ENRAF TAG
				1	5	AP101-WSTA-LDT-151
				1	6	AP101-WSTA-LDT-152
1	1	AP101-WST-LIT-101		1	8	AP102-WSTA-LDT-151
1	2	AP102-WST-LIT-101		1	9	AP102-WSTA-LDT-152
1	3	AP103-WST-LIT-101		1	11	AP103-WSTA-LDT-151
1	4	AP104-WST-LIT-101		1	12	AP103-WSTA-LDT-152
				2	36	AP104-WSTA-LDT-151
				2	37	AP104-WSTA-LDT-152
				2	39	AP105-WSTA-LDT-151
				2	40	AP105-WSTA-LDT-152
				2	42	AP106-WSTA-LDT-151
				3	61	AP106-WSTA-LDT-152
2	31	AP105-WST-LIT-101		3	63	AP107-WSTA-LDT-151
2	32	AP106-WST-LIT-101		3	64	AP107-WSTA-LDT-152
2	33	AP107-WST-LIT-101		3	66	AP108-WSTA-LDT-151
2	34	AP108-WST-LIT-101		3	67	AP108-WSTA-LDT-152

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

[ ] 4.5. **FWS** to **initial** and **date** below for the completed Tank ENRAF temporary power connections and field calibration testing per the above work steps: Repeat above work steps for the following additional risers.

- AP101-WSTA-LDT-151 (069): JMU / 8/5/10 (FWS initial / Date)
- AP101-WSTA-LDT-152 (070): JMU / 8/5/10
- AP102-WSTA-LDT-151 (069): JMU / 8/1/10
- AP102-WSTA-LDT-152 (070): JMU / 8/1/10
- AP103-WSTA-LDT-151 (069): JMU / 8/5/10
- AP103-WSTA-LDT-152 (070): JMU / 8/5/10
- AP104-WSTA-LDT-151 (069): JMU / 8/1/10
- AP104-WSTA-LDT-152 (070): JMU / 8/1/10
- AP105-WSTA-LDT-151 (069): JMU / 8/5/10
- AP105-WSTA-LDT-152 (070): JMU / 8/5/10
- AP106-WSTA-LDT-151 (069): JMU / 8/1/10
- AP106-WSTA-LDT-152 (070): JMU / 8/1/10
- AP107-WSTA-LDT-151 (069): JMU / 8/5/10
- AP107-WSTA-LDT-152 (070): JMU / 8/5/10
- AP108-WSTA-LDT-151 (069): JMH / 8/5/10
- AP108-WSTA-LDT-152 (070): JMU / 8/5/10

FWS initial / Date

[ ] 4.6. Contact **Engineering** to **review** the completed Field calibration **data sheets** for the above listed (**16**) new Enraf and Engineering has **declared** these Enraf as **operable** to perform surveillances for monitoring of annulus leak detection.

David Bames / 8/11/10
Eng. Signature Date

Shift Operation manager:

[ ] 4.7. **Shift Operation manager** to **Ensure** that they are prepared to accept the above new (**16**) ENRAFs as **operable**, And or prepared to use them to **perform surveillance for monitoring of annulus leak detection.** PER THE ATTACHED DATA SHEETS.

[signature] / 8/11/10
SOM SIGNATURE DATE

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

[✓] 4.8. **Shift Operation manager approval** to take the following existing (**8**) Flake boxes (Manual tapes) **out of service** and has given permission to proceed by his signature below.

AP101-WSTA-LIS-121B (071) AP102-WSTA-LIS-122C (071) AP103-WSTA-LIS-123B (071)
AP104-WSTA-LIS-124C (071) AP105-WSTA-LIS-125A (071) AP106-WSTA-LIS-126C (071)
AP107-WSTA-LIS-127A (071) AP108-WSTA-LIS-128C (071)

_____ / 8/11/10
SOM SIGNATURE DATE

[✓] 4.9. Contact **Bill Bryant** to notify his field work supervisor (FWS) that work package TFC-WO-10-1379 can proceed with MODIFICATION of the existing 8 annulus manual tapes.

NOTE- STEPS 4.10 AND 4.11 AND THEIR SUB-STEPS MAY BE WORKED CONCURRENTLY, IN ANY ORDER OR IN PARALLEL, AS DIRECTED BY THE FWS.

[✓] 4.10. **Remove** (**8**) existing Flake boxes (Manual tapes) on annulus Risers (1 **per tank**). Remove liner and Shield plugs and cap off (**8**) associated **airlines** per the following work instructions and **ECN-726946** pages **7 and 31 through 33**.

[✓] 4.10.1. HPT perform pre-job survey. Document RSR # on the Work Record.

[✓] 4.10.2. Disconnect flake box (Manual tapes) **wiring** and **conduit**, Conduit/FS boxes will be used for new Enraf (s) installations.

[✓] 4.10.3. Disconnect the instrument air line tubing from Flake box (manual tape).

[✓] 4.10.4. Remove Valves and Cap/plug the air supply tubing per **ECN-726946** pages **7 and 31 through 33**.

[✓] 4.10.5. Place ground cover(s) around the riser(s) prior to opening, as required.

[✓] 4.10.6. Remove the Flake box (manual tapes) assembly and associated components per **ECN-726946** pages **7, 34 through 36,** and the following work steps.

[✓] 4.10.6.1. Remove the existing gasket.

[✓] 4.10.6.2. Dispose of riser flange and bolts per in accordance with the Waste Planning Checklist.

[✓] 4.10.6.3. If required, install a temporary PVC Blind flange (pancake)

[✓] 4.10.7. Remove **5 foot shield plug** from riser as directed by field work supervisor and the following steps:

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

[✓] 4.10.7.1. Dispose of Shield plug in accordance with the Waste Planning Checklist.

[✓] 4.10.8. Remove **25 foot Kynar** liner as directed by field work supervisor and the following steps:

[✓] 4.10.8.1. Dispose of Kynar in accordance with the Waste Planning Checklist.

[✓] 4.10.9. **FWS** to **initial** and **date** below the completed Tank (**8**) **manual tape removal** per the above work steps: Repeat above work steps for the following additional components/risers.

- AP101-WSTA-LIS-121B (071) JMU / 8/12/10 (FWS initial / Date)
  AP102-WSTA-LIS-122C (071) JMU / 8/12/10 (FWS initial / Date)
  AP**103**-WSTA-LIS-123B (071) JMU / 8/12/10 (FWS initial / Date)
  AP104-WSTA-LIS-124C (071) JMU / 8/12/10 (FWS initial / Date)
  AP**105**-WSTA-LIS-125A (071) JMU / 8/12/10 (FWS initial / Date)
  AP106-WSTA-LIS-126C (071) JMU / 8/12/10 (FWS initial / Date)
  AP**107**-WSTA-LIS-127A (071) JMU / 8/12/10 (FWS initial / Date)
  AP108-WSTA-LIS-128C (071) JMU / 8/12/10 (FWS initial / Date)

Install 8 new Enraf ALD:

[✓] 4.11. Install (**8**) new ENRAFs (ALDs) on annulus Risers (**1 per tank**) per the following work steps and **ECN** page **5, 7, 14** and drawing H-2-817634 assembly -010. These Enrafs have been pre marked for riser location.

[✓] 4.11.1. Install the new gasket & ball valve on riser and **ensure** the new 4" ball valve is in the **closed position**.

[✓] 4.11.2. Tighten fasteners (at least two).

Note that riser survey benchmark shall be vertically clear.

[ ] 4.11.3. Install ENRAF mechanical assemblies to the riser. The Enraf displays (**Gauge**) ideally shall **face North** and if they are blocking the benchmark, they should be rotated as few bolt holes as needed to provide clearance above the benchmark.

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

[✓] 4.11.4. **FWS** Perform **verification** that the **slot** in the **adapter flange** (ref. dwg. # H-2-817634, P/N 15) **is parallel** to the **Enraf wire travel direction** (parallel to the longitudinal axis of the electronics housing).

- AP101-WSTA-LDT-153 (071) JMU / 8/16/10 (FWS initial / Date)
  AP102-WSTA-LDT-153 (071) JMU / 8/13/10 (FWS initial / Date)
  AP103-WSTA-LDT-153 (071) JMU / 8/13/10 (FWS initial / Date)
  AP104-WSTA-LDT-153 (071) JMU / 8/13/10 (FWS initial / Date)
  AP105-WSTA-LDT-153 (071) JMU / 8/16/10 (FWS initial / Date)
  AP106-WSTA-LDT-153 (071) JMU / 8/13/10 (FWS initial / Date)
  AP107-WSTA-LDT-153 (071) JMU / 8/16/10 (FWS initial / Date)
  AP108-WSTA-LDT-153 (071) JMU / 8/13/10 (FWS initial / Date)

NOTE- STEP 4.2.5 REQUIRES THE USE OF THE FOLLOWING EQUIPMENT, TORQUE WRENCH/DRIVER, RECOMMENTED ALL MODEL ***ALL, CALIBRATED**.

[✓] 4.11.5. Ensure required torque readings on the flange bolts are per the following. (Ref. dwg# H-2-817634, notes 4 for 2" & 4")

2" flange gasket (garlock 3000 type): 52-76 ft. lbs.

4" flange gasket (garlock 3000 type): 63-70 ft. lbs.

M&TE#: 817-88-01-029 Cal. Due Date: 11/5/10

[✓] 4.11.6. **Ensure** applicable **I.D. tags** are installed per ECN# 726946, pages 6.

[✓] 4.11.7. **FWS** to **initial** and **date** below the completed Tank (8) new **ENRAF installation** per the above work steps: Repeat above work steps for the following ENRAFS.

- AP101-WSTA-LDT-153 (071) JMU / 8/16/10 (FWS initial / Date)
  AP102-WSTA-LDT-153 (071) JMU / 8/16/10 (FWS initial / Date)
  AP103-WSTA-LDT-153 (071) JMU / 8/16/10 (FWS initial / Date)
  AP104-WSTA-LDT-153 (071) JMU / 8/16/10 (FWS initial / Date)
  AP105-WSTA-LDT-153 (071) JMU / 8/16/10 (FWS initial / Date)
  AP106-WSTA-LDT-153 (071) JMU / 8/16/10 (FWS initial / Date)
  AP107-WSTA-LDT-153 (071) JMU / 8/16/10 (FWS initial / Date)
  AP108-WSTA-LDT-153 (071) JMU / 8/16/10 (FWS initial / Date)

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

NOTE- STEP **4.11.8**, IF POWER OUTLET IS NOT AVAILABLE, A PORTABLE GENERATOR MAY BE USED. PERMANENT POWER WILL BE INSTALLED LATER IN WORK PACKAGE TFC-WO-10-1379.

[✓] 4.11.8. Connect temporary power to the Enraf ALD via an extension cord with GFI, if required.

[✓] 4.11.9. Perform post installation calibration/initial settings on Enraf ALDs per Procedure 5-LCD-125 and the following work steps. **Enraf Addresses in ECN-726946 page 13.**

JJK pen/ink 11/15/10 see work mem

[ ] 4.11.9.1 5-LCD-125 change Enraf settings to (AH=02), (LA=0) AND (LL=0) Then Perform 6-LDD-485 Appropriate steps with initial PM data sheets.

Table 1: Enraf Addresses

MODULE	ADDRESS	ENRAF TAG		MODULE	ADDRESS	ENRAF TAG
1	1	AP101-WST-LIT-101		1	7	AP101-WSTA-LDT-153
1	2	AP102-WST-LIT-101		1	10	AP102-WSTA-LDT-153
1	3	AP103-WST-LIT-101		2	35	AP103-WSTA-LDT-153
1	4	AP104-WST-LIT-101		2	38	AP104-WSTA-LDT-153
2	31	AP105-WST-LIT-101		2	41	AP105-WSTA-LDT-153
2	32	AP106-WST-LIT-101		3	62	AP106-WSTA-LDT-153
2	33	AP107-WST-LIT-101		3	65	AP107-WSTA-LDT-153
2	34	AP108-WST-LIT-101		3	68	AP108-WSTA-LDT-153

[✓] 4.11.10. **FWS** to **initial** and **date** below for the completed Tank ENRAF temporary power connections and field calibration testing per the above work steps: Repeat above work steps for the following additional risers.

- AP101-WSTA-LDT-153 (071) JMU / 8/17/10 (FWS initial / Date)
  AP102-WSTA-LDT-153 (071) JMU / 8/17/10 (FWS initial / Date)
  AP103-WSTA-LDT-153 (071) JMU / 8/17/10 (FWS initial / Date)
  AP104-WSTA-LDT-153 (071) JMU / 8/17/10 (FWS initial / Date)
  AP105-WSTA-LDT-153 (071) JMU / 8/17/10 (FWS initial / Date)
  AP106-WSTA-LDT-153 (071) JMU / 8/17/10 (FWS initial / Date)
  AP107-WSTA-LDT-153 (071) JMU / 8/17/10 (FWS initial / Date)
  AP108-WSTA-LDT-153 (071) JMU / 8/17/10 (FWS initial / Date)

[ ] 4.12. Contact **Engineering** to **review** the completed Field calibration **data sheets** for the above listed (**8**) new Enraf and Engineering has **declared** these Enraf (s) as **operable** to perform surveillances for monitoring of annulus leak detection.

David Sauer / 8/27/10
Eng. Signature Date

241-AP-101 through AP-108 annulus install new ENRAF (ALDs).

[ ] 4.13. Contact the shift office to get The Senior Shift manager acceptance signature for the (**8**) ENRAFs as **operable** to perform surveillance for monitoring of annulus leak detection.

B Wells / 9/20/10
SOM SIGNATURE DATE

5.0 POST-ACTIVITY/MAINTENANCE TESTING

[✓] 5.1. Post-Maintenance Testing requirement is met with successful completion of steps 4.4 and 4.11.9 above.

[✓] 5.2. An operational functional test of the Enraf system will be performed under work TFC-WO-10-1379.

6.0 RESTORATION ACTIONS

[✓] 6.1. Job Site Cleanup

[✓] 6.1.1. HPT perform post-job survey.

JMH WTP-001298 9/26/10 WTP-001298
Signature DATE Survey #

[✓] 6.1.2. FWS ensure the job site has been cleaned up and all waste has been placed in the proper containers per Waste Planning Checklist, as necessary.

[ ] 6.1.3. FWS to review work package for trends and lessons learned. Conduct a Post Job Review on all fieldwork, marking "X" in Feedback block, where appropriate.

[✓] 6.1.4. System Engineer (Bob Nicholson or designee) update the permanent Dome Load Record following completion of this work package.

[✓] 6.1.5. System Engineer (Bob Nicholson or designee) contact Projects and Maintenance Engineering to update PM's and initial calibration date of new equipment. D Bragg 9/28/10

[✓] 6.1.6. System Engineer (Bob Nicholson or designee) to **ensure** that the **Flake box procedure 3-LDD-629** has been deactivated.

Robert Nicholson 9/27/10
Eng. Signature Date

Work Order: TFC-WO-10-1378

Title: 241-AP Replace manual tapes with new ENRAF Assemb.

Date Created: 4/9/10 11:40:02
Equipment: 241-AP-ANN-LDK
SC/I: ☐
WorkFlow: WO Standard
Planner: Hebert, Larry J
Job Plan:
WO Type: 4 - MODIFICATION
Assigned: Niebuhr, Dan
Farm/Facility: 241AP
State: Ready For Work
Phase Desig:
PM Id:
RAD Risk: Low
Flow Status: OK
Frequency:
CACN: 200654
Project Id:
Date Reqd: 4/9/10 08:59:18
Priority: 2.2 Environmental Compliance
Route Id:

Description:

241-AP, Install Enraf assemblies (24) in place of manual tapes (3 PER TANK) on tanks ANNULUS FOR AP-101,102,103,104,105,106,107 AND 108. Provide temporary power (pigtails) and complete field calibration testing and turn over to operations for routine leak detection surveillances.

Work Order: TFC-WO-10-1378

Title: 241-AP Replace manual tapes with new ENRAF Assemb.

Step 1 **Of** 1 **Step Id:** 001 **State:** Ready For Work **Safety Class:**

Sched Start: **Sched Comp:** **Related Step/Link:**

Step Instructions:

See attached work instructions:

Assets	Seq	Asset Class	Asset Id	Asset Name	SC/I	Expiration Date
	1	Equipment	241-AP-ANN-LDK	LEAK DETECTION,ANNULUS	☐	

Trades	Crew	Trade Id:	Trade Description:	Workers	Act Hrs.	Delay Code
		C020	Electricians	2	40	
		C080	Plumbers & Pipefitters	3	120	
		M010	First Line Supervisors	1	24	
		T050	Health Physics Technicians	2	80	
		T060	Industrial Health/Safety Tech	1	40	
		T070	Instrument & Control Techs	1	40	

Attachments: There are 12 document(s) attached to this work order

Description	Path/Name
Step Attachment	
TFC-WO-10-1378 AP-101 - AP-108 Enraf mech RECORI	TFC-WO-10-1378 AP-101 - AP-108 Enraf mech RECORD r2 __1072699.doc
ECN-726946-R0 (Released).docx	ECN-726946-R0 (Released)__1063734.docx
MIRF 10-1378_1379.docx	MIRF 10-1378_1379__1072853.docx
AP Electrical Hazard Eval.pdf	AP Electrical Hazard Eval__1073274.pdf
AP-Farm ENRAF Upgrades Ground Scan.pdf	AP-Farm ENRAF Upgrades Ground Scan__1063733.pdf
ECN-10-000196 .pdf	ECN-10-000196 __1072698.pdf
ECN-726946-R1_-_[1005241121].pdf	ECN-726946-R1_-_[1005241121]__1072697.pdf
Route map .pdf	Route map __1073275.pdf
TFC-10-1378 MSDS.pdf	TFC-10-1378 MSDS__1072825.pdf
TFC-WO-10-1378 WPLAN CKLT .pdf	TFC-WO-10-1378 WPLAN CKLT __1073361.pdf
TFC-WO-10-1378, REV.1 JHA pdf.pdf	TFC-WO-10-1378, REV.1 JHA pdf__1073359.pdf
USQ-TF-10-0709-D.pdf	USQ-TF-10-0709-D__1072864.pdf

Electronic Approvals:

Date	State	Response	Profile	Name	Role
4/9/10 11:40:03	Ready For Planning	Approved	ret_&_bo_ops_shift_mgr	Schaleger, John	
4/21/10 12:47:47	In Planning	Approved	ret_&_bo_planner	Hebert, Larry J	
6/7/10 16:51:44	In Approval	Approved	ret_&_bo_planner	Hebert, Larry J	bo_planner
6/15/10 11:58:05	In Approval	Approved	ret_&_bo QA	Heaney, Jerry	bo_qa
6/16/10 05:42:07	In Approval	Approved	ret_&_bo_rad_con	Holbrook, Arlo	ret_rad_con
6/17/10 09:53:12	In Approval	Approved	ret_&_bo_environ	Tifft, Sherm	bo_environmental
6/18/10 11:19:37	In Approval	Approved	ret_&_bo Resp. Eng.	Nicholson, Robert s (Bob)	ret_&_bo resp. eng.
6/18/10 12:24:18	In Approval	Approved	ret_&_bo_fws	Jones, Ronald W	ret_field_work_suprv
6/21/10 10:50:43	In Approval	Approved	ret_&_bo_ind_hygiene	Cranston, Mark	ret_ind_hygiene
6/21/10 11:08:22	In Approval	Approved	ret_&_bo_safety	Tveit, Mark	ret_safety

Work Order: TFC-WO-10-1378

Title: 241-AP Replace manual tapes with new ENRAF Assemb.

Electronic Approvals:

Date	State	Response	Profile	Name	Role
6/21/10 16:54:25	Ready For Work	Approved	ret_&_bo_planner	Hebert, Larry J	

FWC

FWS Completed By: JMH FWC Date: 9/23/10 Update Job Plan (Y/N): _____

Completed Satisfactorily(yes,no): Y Asset Condition: _____

Comments: _____

Work Records

Type	Created By:	Created On:
Status Tracking	**Hebert, Larry J**	**4/20/10 07:34:38**

Drafted work instructions will get with the fws to review and perform a walkdown with the craft.

Status Tracking	**Hebert, Larry J**	**4/26/10 16:32:13**

Work instructions drafted, sent out for approval/Review, recieved the scann report back and Bob Nicholson is is working on the Cross reference list for lock and tag. Excavation report being initiated and approval.

Status Tracking	**Hebert, Larry J**	**4/29/10 08:04:11**

If the instillation is in the annulus you do not require a sample plan or CHEA.

Status Tracking	**Hebert, Larry J**	**6/21/10 08:59:32**

address the transfer line with-in 5 feet of Excavation, per Engineering at one point we will be with in the 5 feet boundary and the other end of the tanks we will be more than 6-8 feet of the boundary. Per engineering once a transfer has been completed a flush of the piping is performed to control radiological sources. The transfer lines will be locked out during this work. Planning contacted Radcon SME and discussed the Excavation within the 5 foot of the transfer lines. and to review the radcon control as outlined in procedures-TFC-ESHQ-RP-ADM-P-01, REV.C-5. and TFC-ESHQ-RP-MON-C-11-REV. B-2. Radcon sme provided the RWP and do to locking out the transfer lines, and flushing no HRA will be required at this time an HPT will perform continious monotoring during excavation.

WO Id: TFC-WO-10-1378

Waste Planning Checklist

1. Will waste be generated?	Yes
2. Will waste be generated in a radiological buffer area or contamination area?	Yes
3. Will EQ be removed? (TF-cover blocks, 222S-Process EQ)	No
4. Will waste contact process waste, tank waste, or tank waste contaminated material?	No
5. Will work involve soil removal?	Yes
6. Will there be any aerosol can(s) disposed of?	No
7. Will asbestos waste be disposed of?	No
8. Will HEPA filters be disposed of?	No
9. Will chemical products or paint be used or disposed of?	No
10. The following waste minimization techniques will be used?	Source reduction

CHEMICAL/PAINT PRODUCTS

Msds No	Chemical / Product Name
012115	Rigid Dark Thread Cutting Oil
012116	Rigid Nu-clear Thread Cutting

11. GENERAL DESCRIPTION OF WASTE

Annulus leak detectors Flake Boxes assemblies (wire, wire drum and displacer) The wire/wire drum consist of stainless steel and platinum-iridium, the displacer consists of polyethylene and stainless steel , The 5 foot sheild plug (Stainless steel). The 1" x 25 foot plastic liner (KYNAR Pipe) that has 2-part EPOXY on it (CIBA-GE1GY Araldite and Poly-mide crosslinger versamid) will be cut up for ease of disposal, flanges (sch 40 black steel) and gaskets (Neoprene Non-Asbestos) also stainless tubing 1/2", valve Stainless steel, Bolts ATSM A307 gr-b A563.Electrical wiring small sizes. Rags, plastic ground cover. 24 total units will be disposed of in AP farm.

11a. Estimate Waste Generated Quanity: 1600 LBS Per: Week Job Length 3 weeks

WASTE MANAGEMENT CONTROLS **Comments**

12. Is Waste Regulated as a Dangerous Waste? Yes hot speck soil

12a. Disposition Instructions:

- Bring into the radiological area only materials/products needed for the job.
- Return soil to the excavation site per RadCon procedure and Environmental Compliance Org. concurrence.
- Ensure no free liquids present.
- Manage and package the waste per TO-100-052 procedure.

Mixed Waste Disposal:
- Dispose of hot specks of soil that cannot be returned to the excavation site as mixed waste. FWS to request a container and ensure delivery prior to the start of the work.

Low-Level Waste Disposal:
- Dispose of the soft debris (e.g., paper, plastic, cloth, rubber,etc.) into the nearest low-level waste collection trailer.
- For waste item that has a size greater than a bread basket, perform dose and smear survey, then record the results on a RSR. Provide the results to Technical Waste Services. The survey will determine whether these waste items meets Surface Contaminated Object criteria, which can be shipped in an IP-I or IP-II type containers. These waste items should not be placed in a waste container until the SCO determination is complete.

Waste Designation Note:
- Both of the cutting fluid products are not regulated.

13. Facility Operations has been notified to take samples? (N/A if not required)	N/A	
14. Is a container already available for each disposition listed in the instructions?	No	request container
15. Does the quantity of the waste exceed capacity of available containers?	No	
16. Identify satellite accumulation area or accumulation area container(s) locations:	See 12a.	

Prepared By:Mandrake Pascual Date: 06/16/2010 Complete: ☑

Scope: This package will perform Acceptance Test Procedure HNF-SD-WM- ATP-077 (ATP) latest revision on (**24**) ENRAFs to be installed at AP-101 through AP-108 tank Annulus (**3 per tank**), Using **Enraf Addresses** recorded in **ECN-726946** attached in this package.

PRECAUTIONS / LIMITATION / PREREQUISITES:

- Installation OF the 24 Enrafs will be performed via work package TFC-WO-10-1378.
- Conduct pre-job briefing.
- Ensure Annulus leak Detector (ALD) displacer is used CAT-ID # 626925.

SPECIFIC WORK INSTRUCTIONS:

1) Perform Acceptance Test Procedure HNF-SD-WM- ATP-077 (ATP) (latest revision) on (**24**) ENRAFs to be installed at AP-101 through AP-108 Using **Enraf Addresses** recorded in **ECN-726946** attached in this package. ✓

P&I ϕ1 JMH 5/18/10

2) After ATP-077 Step 2.10.13 has been completed, perform the following steps to re-name the gauge identifier parameter. This is for interim tank identification until TMACS is connected & tested.

- Command [W2=Enraf2] enter.
- Command [TI] enter.
- Record tank identifier displayed on attached supplementary data sheet.
- If tank identifier displayed is not correct, change to appropriate tank number (example TI=AN-101) and then perform the following steps:

P&I ϕ2 JMH 5/18/10

- Command [EX] enter.
- Press "F2" key and enter address "~~00~~". from attached ECN continuation sheet.

NOTE: After the following step, the tank location should show just above the level reading in the ENRAF data logger program.

- Press "F2" key and enter the address of the ENRAF gauge.

3) Return to ATP-077, Section 2.11 to complete the ATP, as needed.

4) Ensure the original ATP data sheets are retained in the work order.

Note: 01-05-11 Scanned Changes Thru (Record Comments of 02-06-11) DT: Clear

5) Save the E-promp file to Logger Program.

6) Initial and date below the completed ATP testing on the following Enrafs, ensuring the "QC Acceptance" tag installed on it.

AP101-WSTA-LDT-151	AP101-WSTA-LDT-152	AP101-WSTA-LDT-153
JMH / 5/18/10	JMH / 5/20/10	JMH / 5/20/10
FWS initial / Date	FWS initial / Date	FWS initial / Date
AP102-WSTA-LDT-151	AP102-WSTA-LDT-152	AP102-WSTA-LDT-153
JMH / 5/24/10	JMH / 5/24/10	JMH / 5/24/10
FWS initial / Date	FWS initial / Date	FWS initial / Date
AP103-WSTA-LDT-151	AP103-WSTA-LDT-152	AP103-WSTA-LDT-153
JMH / 5/26/10	JMH / 5/27/10	JMH / 5/27/10
FWS initial / Date	FWS initial / Date	FWS initial / Date
AP104-WSTA-LDT-151	AP104-WSTA-LDT-152	AP104-WSTA-LDT-153
JMH / 5/27/10	JMH / 5/27/10	JMH / 5/27/10
FWS initial / Date	FWS initial / Date	FWS initial / Date
AP105-WSTA-LDT-151	AP105-WSTA-LDT-152	AP105-WSTA-LDT-153
JMH / 5/27/10	JMH / 5/27/10	JMH / 6/1/10
FWS initial / Date	FWS initial / Date	FWS initial / Date
AP106-WSTA-LDT-151	AP106-WSTA-LDT-152	AP106-WSTA-LDT-153
JMH / 6/1/10	JMH / 6/2/10	JMH / 6/2/10
FWS initial / Date	FWS initial / Date	FWS initial / Date
AP107-WSTA-LDT-151	AP107-WSTA-LDT-152	AP107-WSTA-LDT-153
JMH / 6/2/10	JMH / 6/2/10	JMH / 6/3/10
FWS initial / Date	FWS initial / Date	FWS initial / Date
AP108-WSTA-LDT-151	AP108-WSTA-LDT-152	AP108-WSTA-LDT-153
JMH / 6/3/10	JMH / 6/4/10	JMH / 6/4/10
FWS initial / Date	FWS initial / Date	FWS initial / Date

2

7) Return the ENRAFs to the material coordinator for storage until installation work order TFC-WO-10-0378 is scheduled to work.

POST MAINTENANCE TESTING:

8) PMT is not required due to this being a calibration testing work package, Final field test of the individual Enraf will be performed under work package TFC-WO-10-1379.

RESTORATION ACTIONS:

- CLOSE OUT WORK PACKAGE:

3

Work Order: TFC-WO-10-1389

Title: 241-AP Shop ENRAF ATP Cal

Date Created: 4/11/10 16:07:54
WorkFlow: WO Standard
WO Type: 4 - MODIFICATION
State: Ready For Work
RAD Risk: Low
CACN: 200654
Priority: 2.2 Environmental Compliance

Equipment: 241-AP-ANN-LDK
Planner: Hebert, Larry J
Assigned: Hay, Mike
Phase Desig:
Flow Status: OE Review Pending
Project Id:

SC/I: ☐
Job Plan:
Farm/Facility: 241AP
PM Id:
Frequency:
Date Reqd: 4/9/10 14:55:49
Route Id:

Description:
241-AP, Shop Perform ATP Calibration on Enraf assemblies (24)

DT
07-30-10

4

Work Order: TFC-WO-10-1389

Title: 241-AP Shop ENRAF ATP Cal

Step 1 **Of** 1 **Step Id:** 001 **State:** Ready For Work **Safety Class:**

Sched Start: **Sched Comp:** **Related Step/Link:**

Step Instructions:

241-AP, Shop Perform ATP Calibration on Enraf assemblies (24)

Assets	Seq	Asset Class	Asset Id	Asset Name	SC/I	Expiration Date
	1	Equipment	241-AP	FARM RELATED EQUIPMENT - TANK	☐	

Trades	Crew	Trade Id:	Trade Description:	Workers	Act Hrs.	Delay Code
	G	T070	Instrument & Control Techs	2	96	N/A

Attachments: There are 3 document(s) attached to this work order

Description	Path/Name
Step Attachment	
TFC-WO-10-1389 ATP Shop test work instructions temp.c	TFC-WO-10-1389 ATP Shop test work instructions temp__1064294.doc
TFC-WO-10-1389 AP Enraf ATP shop TST.pdf	TFC-WO-10-1389 AP Enraf ATP shop TST__1064295.pdf
ATP-077 DA149215.tif	ATP-077 DA149215__1064146.tif

Electronic Approvals:

Date	State	Response	Profile	Name	Role
4/11/10 16:07:54	Ready For Planning	Approved	ret_&_bo_ops_shift_mgr	Schaleger, John	
4/26/10 16:40:19	In Planning	Approved	ret_&_bo_planner	Hebert, Larry J	
4/27/10 15:13:57	In Approval	Approved	ret_&_bo_planner	Hebert, Larry J	resp. eng-per telecon
4/27/10 17:29:38	In Approval	Approved	ret_&_bo_fws	Hay, Mike	ret_field_work_suprv
4/28/10 12:02:17	In Approval	Approved	ret_&_bo_safety	Randles, Jason	ret_safety
4/28/10 15:02:31	In Approval	Approved	ret_&_bo QA	Heaney, Jerry	ret_qa
4/28/10 15:05:06	Ready For Work	Approved	ret_&_bo_planner	Hebert, Larry J	

FWC

FWS Completed By: JMH **FWC Date:** 6/7/10 **Update Job Plan (Y/N):** N/A

Completed Satisfactorily(yes,no): Y **Asset Condition:** N/A

Comments: N/A

✓ 5

Work Records

Type	Created By:	Created On:
Status Tracking	**Hebert, Larry J**	**4/20/10 12:38:43**

Work instructions drafted, sent out for approval/Review, recieved the scann report back and Bob Nicholson is is working on the Cross reference list for lock and tag. Excavation report being initiated and approval.

Status Tracking	**Hebert, Larry J**	**4/27/10 16:07:10**

Work instruction drated sent out for approval JHA drafted and will carry out for approvals to make a standing for future Enraf calibrations. the above entry made in error, for for TFC-WO-10-1379 work package.

Status Tracking	**Hebert, Larry J**	**4/27/10 16:28:12**

recieved per-tele-con approval from enraf system engineer dave Barnes.

Status Tracking	**Hebert, Larry J**	**4/28/10 12:54:13**

Larry,

Please confirm that the acceptance test being performed on the Enraf's is being performed in the Shop and not in the tank farm.
If it is a shop test, add a statement to the work instructions stating such and forward to me. I will then be able to "N/A" the work order.

Status Tracking	**Hebert, Larry J**	**4/28/10 14:55:41**

As we discussed, Work Order TFC-WO-10-1389 is an acceptance test on Enraf's that is to be performed in a shop outside of the AP tank farm fence.
This work activity is, therefore, not applicable to the USQ Process.
No USQ evaluation is required. Quinn Decker usq evaluator

Status Tracking	**Hebert, Larry J**	**4/28/10 15:40:09**

Recieved all SME approvals package is ready for an OE to review / release

WRPS WORK RECORD

1. Document Number: TFC-WO-10-1389

2. Work Item Title: 241-AP Shop ENRAF ATP Cal

Date	Turnover, Problem Description, Action Taken	Feed Back (X)	Name	Craft/ Resource Type	Hours
	Reviewed by Work Activity Review Team				
	K Smith / 4/29/10 **Initials/Date**				
5/13 pen/INK	Add step 2.10.13 to allow tank address and ID to enraf before disconnecting power.		Hay per Telecon LJK		
			DAVE BARNES	Eng	
				Plan	
5/19 pen/INK	Clarified step as to were address location is and what the value should be.		Hay per Telecon LJK		
			DAVE BARNES	Eng	
				Plan	
6/7	Completed all 24 annulas enraf cals for AP farm and returned to material coordinator for storage. Job site clean, no waste		Hay		
7/20/10	Planner post review complete, ALL SAT. FACTORS completed. Planning sent TEST EXECUTION DATA sheet to Engineering for level retension			Plan	
				Planner	
01-05-11	Scanned- Champs = 7 pgs. (Record in IDMS as of 02-06-11)		DT	Clerk	

Work History (and ISMS Feedback) Review Results: **Lessons Learned Needed? YES / (NO)** (circle one)

Reviewed By:

Work Control Center — M C Higginson (Print/Type Name) — M C Higginson (Signature) — 12-29-10 (Date)

(INSTALLATION INSTRUCTIONS - NOT TO BE INCORPORATED)

Table 1: Enraf Addresses

MODULE	ADDRESS	ENRAF TAG	RISER #	MODULE	ADDRESS	ENRAF TAG	RISER #
1	1	AP101-WST-LIT-101		2	35	AP103-WSTA-LDT-153	71
1	2	AP102-WST-LIT-101		2	36	AP104-WSTA-LDT-151	69
1	3	AP103-WST-LIT-101		2	37	AP104-WSTA-LDT-152	70
1	4	AP104-WST-LIT-101		2	38	AP104-WSTA-LDT-153	71
1	5	AP101-WSTA-LDT-151	69	2	39	AP105-WSTA-LDT-151	69
1	6	AP101-WSTA-LDT-152	70	2	40	AP105-WSTA-LDT-152	70
1	7	AP101-WSTA-LDT-153	71	2	41	AP105-WSTA-LDT-153	71
1	8	AP102-WSTA-LDT-151	69	2	42	AP106-WSTA-LDT-151	69
1	9	AP102-WSTA-LDT-152	70	3	61	AP106-WSTA-LDT-152	70
1	10	AP102-WSTA-LDT-153	71	3	62	AP106-WSTA-LDT-153	71
1	11	AP103-WSTA-LDT-151	69	3	63	AP107-WSTA-LDT-151	69
1	12	AP103-WSTA-LDT-152	70	3	64	AP107-WSTA-LDT-152	70
2	31	AP105-WST-LIT-101		3	65	AP107-WSTA-LDT-153	71
2	32	AP106-WST-LIT-101		3	66	AP108-WSTA-LDT-151	69
2	33	AP107-WST-LIT-101		3	67	AP108-WSTA-LDT-152	70
2	34	AP108-WST-LIT-101		3	68	AP108-WSTA-LDT-153	71

Table 2: Parts List

QUANTITY	PART DESCRIPTION	PART NUMBER
1	CIU Host Communication Module HCM-GPU	Enraf 0780511
1	CIU AC Power Supply PSA	Enraf 0780501
3	CIU Field Communication Module FCM-BPM	Enraf 0780531
1	30A Breaker	Siemens BLH30
8	Control Relay	Potter & Brumfield KRPA-14DG-24
8	Time Off-Delay Relay	Allen Bradley 700-HRV52TU24
16	Control Relay Base 11 pins din rail mount	Allen Bradley 700-HN101
1	Transfer Switch	Allen Bradley 194L-E32-3252
1	CIU din mount 120vac outlet	Phoenix Contact, 2963860, Outlet
1	24 VDC Power Supply	Allen Bradley 1606-XL120D
1	Transfer Switch Lockable Handle	Allen Bradley 194L-HE4E-325
1	Transfer Switch Enclosure	Hoffman A1066JFGR
1	Isolation Transformer	ACME T-3-53043-S
1	Alternate Power Male wall Connector	Bryant, #70530, 30A Male Base, White Cup, Twist lock
1	Alternate Power Plug	Bryant, #72002, Black Plug, Weather Protected
1	Alternate Power Connector Cover	Bryant, #70530MBWP, Spring Loaded Hinge Cover, Aluminum, Weather Proof
1	Alternate Power Rcpt, Enclosure	Crouse Hinds, FD2, ¾" single gang cast
34	Grounding Kits	Hoffman, #LLGK, Grounding Kit
8	Pull Box	Hoffman A12108CHFL
1	Estimated 2000 ft of 1" Conduit	
1	Estimated 1000 ft of Single Pair AWG 20, Shield, 600V	
1	Estimated 1000 ft of 3/C AWG 10, 600V	

Note: An AutoCAD page may be used in place of this form (the header section items must be included on the AutoCAD page).

WRPS JOB HAZARD ANALYSIS CHECKLIST

Prepared By (print/sign/date): Larry Hebert	**Work Package/Procedure No.:** Various
Work Scope/Description: ENRAF ATP Cal	
Specific Work Location: 2703E, MO-041, MO-027	
Walk Down Conducted: ☒ YES **If YES, Date Performed:** 4/28/10 ☐ NO **If NO, Level 2 Manager Approval:**	

Specific Hazard Analysis and Safety Work Requirements

Known and/or potential hazards have been evaluated at the task level with applicable tasks, required controls and methods of control noted below.

Approvals:

JM Hay JMHay 4/28/10 — **Supervisor (print/sign/date)**

Jason Randles 4/28/10 — **Industrial Safety (print/sign/date)**

Gary Hutchins Gary Hutchins 4-28-10 — **Other (print/sign/date)**

Activity/Task Hazard Analysis			Method:*
Crane or other Lifting Equipment Lifting and Rigging Objects	Yes / No ☐ ☒	☐ Normal ☐ Special Lift ☐ Critical Lift ☐ Signalman assigned ☐ Spotter ☐ Lifting Equip Inspection ☐ Area around crane barricaded ☐ Lift <30°F and Engineering Evaluation Completed Task:	
Vehicular Traffic, Heavy Equipment and or Forklift Use	Yes / No ☐ ☒	☐ Traffic Barricades ☐ Cones ☐ Signs ☐ Spotters (2 min) ☐ Lane Closure ☐ Communication with Equipment Operator ☐ Surface Condition ☐ Traffic Vest ☐ Equipment operator meets training requirements Task:	
Overhead Utilities	Yes / No ☐ ☒	☐ De-energization req. ☐ Insulation blankets req. ☐ Wire watch req. ☐ Req. clearance distance ☐ Safe work zone marked Task:	
Falls/Roof Work	Yes / No ☐ ☒	☐ Fall Protection Plan ☐ Elevated Work Platform/Aerial Lift (inspected and operators trained) Task:	
Ladder or Scaffold Use	Yes / No ☐ ☒	☐ Inspect ladder/scaffold condition ☐ Current ladder/scaffold inspection ☐ Ladder tied off ☐ Proper ladder size ☐ Proper ladder position/support ☐ Safe ladder/scaffold practices will be followed Task:	
Moving/Falling Objects from height	Yes / No ☐ ☒	☐ Tether small objects ☐ Use rope, canvas bag ☐ Barricade around potential fall area ☐ Barricade tape ☐ Hard Hats ☐ Tie off tools/materials ☐ Warning signs ☐ Cover openings ☐ Rigid railing required Task:	
Excavations	Yes / No ☐ ☒	☐ Excavation/Shoring permit ☐ Inspect prior to entry ☐ Competent Person Inspection ☐ Proper sloping/shoring ☐ Access/egress provided ☐ Scans ☐ Barricades ☐ Confined Space Evaluation Task:	
Underground Utilities (line locating)	Yes / No ☐ ☒	☐ Review ground scans ☐ Received excavation permit ☐ Insulated hand tools ☐ Maintain clearance distance ☐ Safe work zone marked Task:	
Fire Hazard, weld, burn, grind, solder	Yes / No ☐ ☒	☐ Extinguishers ☐ Fire Watch ☐ Respiratory Protection ☐ Adjacent area protected ☐ Flammable Material Removed ☐ Hot Work Permit ☐ Fire Blanket ☐ Welding Screen ☐ Fire Marshall Permit # Task:	
Noise >85 dBA	Yes / No ☐ ☒	☒ Hearing Protection ☐ Ear Plugs ☐ Ear Muffs ☐ Noise Monitoring Task:	

*Method: 1- Skill Based, 2- Precaution/Limitation/Prerequisite, 3- WARNING, 4- Work Instruction, 5- Permit/Plan, 6- Pre-Job Brief

WRPS JOB HAZARD ANALYSIS CHECKLIST

Hazardous Energy Air/Steam Fluid	Yes / No ☐ ☒	☐ Depressurize ☐ PPE ☐ Whip Check tie-downs ☐ Cool down systems ☐ Lockout/Tagout Task:	
Stored Energy	Yes / No ☐ ☒	☐ Lockout/Tagout ☐ Remove Energy ☐ PPE Task:	
Rotating/Moving Equipment or Pinch Points	Yes / No ☒ ☐	☐ Lockout/Tagout ☐ Machine guards in place ☐ Block parts against motion ☐ PPE ☒ Hand/Body Position ☐ Remove Loose clothing Task: Scope; ATP cal	1
Chemical Use/Hazardous Atmosphere	Yes / No ☐ ☒	☐ MSDS Review ☐ Proper containers/labels ☐ PPE ☐ Safety shower identified an available ☐ Fume hoods, glove boxes, etc. ☐ Eye wash station ☐ Asbestos work permit ☐ IH Monitoring Plan for chemical use ☐ Ventilation ☐ Wet Work Methods ☐ Respiratory Protection: ☐ APR ☐ FF ☐ HF ☐ PAPR ☐ Airline ☐ SCBA ☐ Carri-Air ☐ Other: Additional Information: _____ Specify Cartridge(s): _____ Cartridge Change Out Schedule: _____ Task:	
Pressurized Gas Cylinders	Yes / No ☐ ☒	☐ Caps on while moving ☐ Secured ☐ Suitable lifting moving device Task:	
Potential Contact with Tank Waste	Yes / No ☐ ☒	☐ Silver shield PPE ☐ Respiratory Protection ☐ Gloves ☐ Hood ☐ Apron Task:	
Eye, Foot, Head, Hand Hazards	Yes / No ☒ ☐	☒ Safety Glasses ☐ Hard Hat ☐ Face Shield ☐ Chemical Goggles ☐ Leather Gloves ☐ Chemical Gloves ☐ Cut Resistant Gloves ☐ Heat Resistant Gloves ☐ Substantial Footwear ☒ Protective Footwear ☐ Chemical Boots Task: Scope; ATP cal. lifting to mount on table.	1
Confined Space	Yes / No ☐ ☒	☐ Permit Required Confined Space ☐ Confined Space Hazard Identification Form Task:	
Wall/Ceiling Penetration	Yes / No ☐ ☒	☐ Scanned area where penetration will take place ☐ Perform Walk Around ☐ Engineering Evaluation Completed Task:	
Radiological	Yes / No ☐ ☒	☐ Radiological Screening Process ☐ AMW ☐ Mockup performed ☐ Minimize Time ☐ Maximize Distance ☐ Shielding ☐ Respiratory Protection ☐ Contain source ☐ Reduce item generating concern ☐ PPE ☐ Apply fixative RWP # Task:	
Flammable / Explosive Hazards	Yes / No ☐ ☒	☐ Bonding ☐ Intrinsically safe tools/equipment Task:	
Tank Farm Vapors or VCS's	Yes / No ☐ ☒	☐ Alternate Entry Method ☐ Temp. VCZ Established ☐ PPE ☐ IH Monitoring and Sampling Plan # ☐ CEHA # Task:	
Lack of Adequate Lighting	Yes / No ☐ ☒	☐ Change work to daytime ☐ Temporary lighting ☐ Light Stand/Plants ☐ Flashlight Task:	
Ergonomic	Yes / No ☒ ☐	☒ 2 person lift ☐ Mechanical lift ☐ Stool/Adjust to work Height ☐ Reach Tools ☐ Handling Cart/Dolly ☐ Powered Tools ☐ Anti-Fatigue mat ☐ Worker Rotation ☐ Other Task: Scope; ATP cal. lifting to mount on table.	1

*Method: 1- Skill Based, 2- Precaution/Limitation/Prerequisite, 3- WARNING, 4- Work Instruction, 5- Permit/Plan, 6- Pre-Job Brief

WRPS JOB HAZARD ANALYSIS CHECKLIST

Laboratory Hazards (e.g., Chemical Splashes, Chemical Compatibility, Reactive, Time Sensitive	Yes / No ☐ ☒	☐ PPE ☐ Chemical Segregation ☐ Volume Limitations ☐ Fume Hoods ☐ Special Labeling or Postings Task:	
Electrical	Yes / No ☐ ☒	☐ LO/TO ☐ Barricade ☐ EWP ☐ AED Locations ☐ Electrical Hazard Evaluation (Site Form A-6005-432) Task:	
Other **Describe:**	Yes / No ☐ ☒	Controls: Task:	
Other **Describe:**	Yes / No ☐ ☒	Controls: Task:	

Walk Down/JHA Participants		Date
[signature]	EGC Hudspeth	4-28-10
JM Hay	JM Hay	4/28/10
[signature]	Rick Sawyer	4/28/10
Gary Hutchens	Gary Hutchens	4/28/10

*Method: 1- Skill Based, 2- Precaution/Limitation/Prerequisite, 3- WARNING, 4- Work Instruction, 5- Permit/Plan, 6- Pre-Job Brief

TEST EXECUTION DATA SHEET					Page 1 of 2
Date: 5/13/10			Tank Number: AP101-WSTA-LDT-151		
Gauge Serial Number: 85405043 2			Test Performed by: Mike Jungirs		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.2.1	EP	EP000	000		
2.2.2	ES	ES0000	0000		
2.2.3	LD	I	I		
2.3.1*	SV	SPU C... or D...			
2.4.1	DC programmed	As read	.33805900		
2.4.2	DC engraved	As read	.33805900		
2.4.5	New DC	DC engraved	N/A		
2.5.3	PARAMETERS	Entered Correctly		√A	
2.5.6	CA	Displacer raises		A	
2.5.8	RL	850 +/- 0.10	850.00		
2.5.10	RL	850 +/- 0.10	850.01		
2.6.4	BU	As read	225.89985		
2.6.5	BV	As read	224.95254		
2.6.6	BW	As read	225.38554		
2.6.7	BU – BV	0 +/- 3 grams	.94731		
2.7.9	F0	As read	11465.386		
2.7.11	F1	As read	12249.180		
2.7.13	F2	As read	12983.308 ~~388~~		
2.7.15	F3	As read	13673.859		
2.8.5	WQ Test Weight	225 +/- 3 grams	225.1325		
2.8.6	WQ – 225	0 +/- 3 grams	.1325		
2.8.9	Displacer Weight Engraved/Marked	As read	221.8		
2.8.12	WQ Displacer	As read	225.0799		
2.8.13	(2.8.12)-(2.8.9)	0 +/- 6 grams	3.2799		

*Densitometer Only

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TEST EXECUTION DATA SHEET			Page 2 of 2		
Date:			**Tank Number:** AP101-WSTA-LDT-151		
Gauge Serial Number:			**Test Performed by:**		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.9.6*	I	Density Display	N/A		
2.9.10*	B	Level Display	N/A		
2.9.12*	DW	Entered Correctly	N/A		
2.9.13*	S1	Entered Correctly	N/A		
2.9.14*	DV	Entered Correctly	N/A		
2.9.15*	DA	Entered Correctly	N/A		
2.9.16*	DI	Entered Correctly	N/A		
2.9.17*	WW	Entered Correctly	N/A		
2.10.2*	Displacer Level	As read	N/A		
2.10.5*	MZ	Entered Correctly	N/A		
2.10.6*	Water level	As read	N/A		
2.10.7*	DK	2.10.6 –8"	N/A		
2.10.8*	DN	2.10.6 – 11"	N/A		
2.10.11*	SC	988-1008 kg/m^3	N/A		
2.11.8	MOTOR LOCK	Locked		A	

*Densitometer Only

Data Sheet and Test Exception Record Acceptance:

Supervisor/Lead — 5/18/10 Date

Quality Control — 5-13-10 Date

Instrument Tech. — 5-13-10 Date

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TEST EXECUTION DATA SHEET					Page 1 of 2
Date: ~~5/13/10~~ MP 5/20/10			Tank Number: AP101-WSTA-LDT-152		
Gauge Serial Number: 854050428			Test Performed by: Mike Jungus		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.2.1	EP	EP000	000		
2.2.2	ES	ES0000	0000		
2.2.3	LD	I	I		
2.3.1*	SV	SPU C... or D...	N/A		
2.4.1	DC programmed	As read	+.338007600 60		
2.4.2	DC engraved	As read	+.338007600		
2.4.5	New DC	DC engraved	N/A		
2.5.3	PARAMETERS	Entered Correctly		A	
2.5.6	CA	Displacer raises		A	
2.5.8	RL	850 +/- 0.10	850.00		
2.5.10	RL	850 +/- 0.10	849.99		
2.6.4	BU	As read	+.27694332 E3		
2.6.5	BV	As read	+.22563330 E3		
2.6.6	BW	As read	+.22640681 E3		
2.6.7	BU – BV	0 +/- 3 grams	1.3025		
2.7.9	F0	As read	+.1141609 E5		
2.7.11	F1	As read	+.12213909 E5		
2.7.13	F2	As read	+.12958823 E5		
2.7.15	F3	As read	+.13657040 E5		
2.8.5	WQ Test Weight	225 +/- 3 grams	+.244887 E3		
2.8.6	WQ – 225	0 +/- 3 grams	.1211		
2.8.9	Displacer Weight Engraved/Marked	As read	222.6		
2.8.12	WQ Displacer	As read	.22549958 E3		
2.8.13	(2.8.12)-(2.8.9)	0 +/- 6 grams	2.89958		

*Densitometer Only

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TEST EXECUTION DATA SHEET			Page 2 of 2		
Date:			Tank Number: AP101-WSTA-LOT-152		
Gauge Serial Number:			Test Performed by:		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.9.6*	I	Density Display	N/A		
2.9.10*	B	Level Display	N/A		
2.9.12*	DW	Entered Correctly	N/A		
2.9.13*	S1	Entered Correctly	N/A		
2.9.14*	DV	Entered Correctly	N/A		
2.9.15*	DA	Entered Correctly	N/A		
2.9.16*	DI	Entered Correctly	N/A		
2.9.17*	WW	Entered Correctly	N/A		
2.10.2*	Displacer Level	As read	N/A		
2.10.5*	MZ	Entered Correctly	N/A		
2.10.6*	Water level	As read	N/A		
2.10.7*	DK	2.10.6 –8"	N/A		
2.10.8*	DN	2.10.6 – 11"	N/A		
2.10.11*	SC	988-1008 kg/m^3	N/A		
2.11.8	MOTOR LOCK	Locked		A	

*Densitometer Only

Data Sheet and Test Exception Record Acceptance:

Supervisor/Lead — 5/20/10 Date

Quality Control — 5-20-10 Date

Instrument Tech. — 5-20-10 Date

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TEST EXECUTION DATA SHEET					Page 1 of 2
Date: 5-17-10			Tank Number: AP 101-WSTA-LDT-153		
Gauge Serial Number: 8540504337			Test Performed by: Libby / Weimbender		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.2.1	EP	EP000	000		
2.2.2	ES	ES0000	0000		
2.2.3	LD	I	I		
2.3.1*	SV	SPU C... or D...	N/A		
2.4.1	DC programmed	As read	.33801400 E+00		
2.4.2	DC engraved	As read	.338014		
2.4.5	New DC	DC engraved	N/A		
2.5.3	PARAMETERS	Entered Correctly	YES		
2.5.6	CA	Displacer raises	YES		
2.5.8	RL	850 +/- 0.10	850.04		
2.5.10	RL	850 +/- 0.10	850.05		
2.6.4	BU	As read	.22717453 E+3		
2.6.5	BV	As read	.22576419 E+3		
2.6.6	BW	As read	.22636167 E+3		
2.6.7	BU – BV	0 +/- 3 grams	.00141034 E+3		
2.7.9	F0	As read	.11601398 E+5		
2.7.11	F1	As read	.12399388 E+5		
2.7.13	F2	As read	.13129251 E+5		
2.7.15	F3	As read	.13823276 E+5		
2.8.5	WQ Test Weight	225 +/- 3 grams	.22593654 E+3		
2.8.6	WQ – 225	0 +/- 3 grams	.00093654 E+3		
2.8.9	Displacer Weight Engraved/Marked	As read	223.1		
2.8.12	WQ Displacer	As read	.22528741 E+3		
2.8.13	(2.8.12)-(2.8.9)	0 +/- 6 grams	.00218741 E+3		

*Densitometer Only

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TEST EXECUTION DATA SHEET			Page 2 of 2		
Date:			**Tank Number:** AP101-WSTA-LDT-153		
Gauge Serial Number:			**Test Performed by:**		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.9.6*	I	Density Display	N/A		
2.9.10*	B	Level Display	N/A		
2.9.12*	DW	Entered Correctly	N/A		
2.9.13*	S1	Entered Correctly	N/A		
2.9.14*	DV	Entered Correctly	N/A		
2.9.15*	DA	Entered Correctly	N/A		
2.9.16*	DI	Entered Correctly	N/A		
2.9.17*	WW	Entered Correctly	N/A		
2.10.2*	Displacer Level	As read	N/A		
2.10.5*	MZ	Entered Correctly	N/A		
2.10.6*	Water level	As read	N/A		
2.10.7*	DK	2.10.6 –8"	N/A		
2.10.8*	DN	2.10.6 – 11"	N/A		
2.10.11*	SC	988-1008 kg/m^3	N/A		
2.11.8	MOTOR LOCK	Locked		A	

*Densitometer Only

Data Sheet and Test Exception Record Acceptance:

Supervisor/Lead — 5/20/10 Date

Quality Control — 5.20.10 Date

Instrument Tech. — 5-20-2010 Date

TEST EXECUTION DATA SHEET					Page 1 of 2
Date: 5/20/10			Tank Number: AP102-WSTA-LDT-151		
Gauge Serial Number: 8540504341			Test Performed by: Mike Jungers		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.2.1	EP	EP000	000		
2.2.2	ES	ES0000	0000		
2.2.3	LD	I	I		
2.3.1*	SV	SPU C... or D...	N/A		
2.4.1	DC programmed	As read	+.33795300E0		
2.4.2	DC engraved	As read	+33795300		
2.4.5	New DC	DC engraved	N/A		
2.5.3	PARAMETERS	Entered Correctly		A	
2.5.6	CA	Displacer raises		A	
2.5.8	RL	850 +/- 0.10	850.04		
2.5.10	RL	850 +/- 0.10	850.04		
2.6.4	BU	As read	+.22781947E03		
2.6.5	BV	As read	+.22602318E03		
2.6.6	BW	As read	+.22694466E03		
2.6.7	BU – BV	0 +/- 3 grams	+~~.000~~.001796295E03 KS 5-20-10		
2.7.9	F0	As read	+.11502791E05		
2.7.11	F1	As read	+.12305556E05		
2.7.13	F2	As read	+.13050595E05		
2.7.15	F3	As read	+.13750414E05		
2.8.5	WQ Test Weight	225 +/- 3 grams	+.22470146E03		
2.8.6	WQ – 225	0 +/- 3 grams	.00029854E03		
2.8.9	Displacer Weight Engraved/Marked	As read	221.8		
2.8.12	WQ Displacer	As read	+.22509149E03		
2.8.13	(2.8.12)-(2.8.9)	0 +/- 6 grams	.00329149E03		

*Densitometer Only

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TEST EXECUTION DATA SHEET			Page 2 of 2		
Date:			**Tank Number:** AP102-WSTA-LDT-151		
Gauge Serial Number:			**Test Performed by:**		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.9.6*	I	Density Display	N/A		
2.9.10*	B	Level Display	N/A		
2.9.12*	DW	Entered Correctly	N/A		
2.9.13*	S1	Entered Correctly	N/A		
2.9.14*	DV	Entered Correctly	N/A		
2.9.15*	DA	Entered Correctly	N/A		
2.9.16*	DI	Entered Correctly	N/A		
2.9.17*	WW	Entered Correctly	N/A		
2.10.2*	Displacer Level	As read	N/A		
2.10.5*	MZ	Entered Correctly	N/A		
2.10.6*	Water level	As read	N/A		
2.10.7*	DK	2.10.6 –8"	N/A		
2.10.8*	DN	2.10.6 – 11"	N/A		
2.10.11*	SC	988-1008 kg/m^3	N/A		
2.11.8	MOTOR LOCK	Locked		A	

*Densitometer Only

Data Sheet and Test Exception Record Acceptance:

Supervisor/Lead — 5/24/10 Date

Quality Control — 5.24.10 Date

Instrument Tech. — ~~5/20/10~~ 5/24/10 Date

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TEST EXCEPTION RECORD

(This page may be reproduced as necessary)

Gauge S/N: 854050434 Page ___ of ___

2.2.3

Test Step Number: | Test Exception Number: 1

Test Exception

Description: Some gauges were received with ft/in parameters, others were metric. The ATP as written assumes ft/in, so the metric gauges must be adjusted to ft/in prior to starting the test.

JM Hay 5/24/10
Originator JM Hay Date

Hold for Resolution: ☐ Continue Test: ☑

Exception Resolution

Description:
Section 2.5.3 converts parameters to ft/in. This section was run out of sequence (first) to correct all metric gauges.

Retest Required: ☑ Retest Not Required: ☐

Retest Record

Description: Complete ATP as written

Concurrence with Resolution:		Resolution Actions / Retest Complete:	
David Barnes	5/24/10	JM Hay	5/24/10
Engineer	Date	Supervisor/Lead	Date
Jon Elliott	5.24.10	Jon Elliott	5.24.10
Quality Assurance	Date	Quality Assurance	Date

JO

TEST EXECUTION DATA SHEET					Page 1 of 2
Date: 5/24/10			Tank Number: AP102 - WSTA - LOT - 152		
Gauge Serial Number: 854050431			Test Performed by: Mike Jungers		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.2.1	EP	EP000	000		
2.2.2	ES	ES0000	0008		
2.2.3	LD	I	I		
2.3.1*	SV	SPU C... or D...	N/A		
2.4.1	DC programmed	As read	+.33798100 E0		
2.4.2	DC engraved	As read	+.337981		
2.4.5	New DC	DC engraved	N/A		
2.5.3	PARAMETERS	Entered Correctly		A	
2.5.6	CA	Displacer raises		A	
2.5.8	RL	850 +/- 0.10	849.99		
2.5.10	RL	850 +/- 0.10	849.99		
2.6.4	BU	As read	+.22829926 E3		
2.6.5	BV	As read	+.22561317 E3		
2.6.6	BW	As read	+.22681670 E3		
2.6.7	BU – BV	0 +/- 3 grams	2.68609		
2.7.9	F0	As read	+.11271448 E3		
2.7.11	F1	As read	+.12097907 E3		
2.7.13	F2	As read	+.12860451 E3		
2.7.15	F3	As read	+.13571603 E3		
2.8.5	WQ Test Weight	225 +/- 3 grams	+.22617067 E3		
2.8.6	WQ – 225	0 +/- 3 grams	+1.17067		
2.8.9	Displacer Weight Engraved/Marked	As read	223.0		
2.8.12	WQ Displacer	As read	+.22794445 E3		
2.8.13	(2.8.12)-(2.8.9)	0 +/- 6 grams	+2.794445		

*Densitometer Only

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TEST EXECUTION DATA SHEET			Page 2 of 2		
Date:			**Tank Number:** AP102-WSTA-LDT-152		
Gauge Serial Number:			**Test Performed by:**		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.9.6*	I	Density Display	N/A		
2.9.10*	B	Level Display	N/A		
2.9.12*	DW	Entered Correctly	N/A		
2.9.13*	S1	Entered Correctly	N/A		
2.9.14*	DV	Entered Correctly	N/A		
2.9.15*	DA	Entered Correctly	N/A		
2.9.16*	DI	Entered Correctly	N/A		
2.9.17*	WW	Entered Correctly	N/A		
2.10.2*	Displacer Level	As read	N/A		
2.10.5*	MZ	Entered Correctly	N/A		
2.10.6*	Water level	As read	N/A		
2.10.7*	DK	2.10.6 –8"	N/A		
2.10.8*	DN	2.10.6 – 11"	N/A		
2.10.11*	SC	988-1008 kg/m^3	N/A		
2.11.8	MOTOR LOCK	Locked		A	

*Densitometer Only

Data Sheet and Test Exception Record Acceptance:

Supervisor/Lead — 5/24/10 Date

Quality Control — 5-24-10 Date

Instrument Tech. — 5/24/10 Date

TEST EXECUTION DATA SHEET					Page 1 of 2
Date: 5/24/10			Tank Number: AP102-WSTA-LDT-153		
Gauge Serial Number: 854050435			Test Performed by: Jaxthan Libbey		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.2.1	EP	EP000	000		
2.2.2	ES	ES0000	0000		
2.2.3	LD	I	I		
2.3.1*	SV	SPU C... or D...	N/A		
2.4.1	DC programmed	As read	+.33796300E0		
2.4.2	DC engraved	As read	337.963		
2.4.5	New DC	DC engraved	N/A		
2.5.3	PARAMETERS	Entered Correctly		A	
2.5.6	CA	Displacer raises		A	
2.5.8	RL	850 +/- 0.10	850.00		
2.5.10	RL	850 +/- 0.10	850.00		
2.6.4	BU	As read	+.22672851E3		
2.6.5	BV	As read	+.22466849E3		
2.6.6	BW	As read	+.22539305E3		
2.6.7	BU – BV	0 +/- 3 grams	2.06002		
2.7.9	F0	As read	+.11641027E5		
2.7.11	F1	As read	+.12459285E5		
2.7.13	F2	As read	+.13219633E5		
2.7.15	F3	As read	+.13932634E5		
2.8.5	WQ Test Weight	225 +/- 3 grams	+.22473557E3		
2.8.6	WQ – 225	0 +/- 3 grams	-0.26443		
2.8.9	Displacer Weight Engraved/Marked	As read	222.3		
2.8.12	WQ Displacer	As read	+.22592629E3		
2.8.13	(2.8.12)-(2.8.9)	0 +/- 6 grams	+3.62629		

*Densitometer Only

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TEST EXECUTION DATA SHEET			Page 2 of 2		
Date:			Tank Number: AP102-WSTA-CDT-153		
Gauge Serial Number:			Test Performed by:		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.9.6*	I	Density Display	N/A		
2.9.10*	B	Level Display	N/A		
2.9.12*	DW	Entered Correctly	N/A		
2.9.13*	S1	Entered Correctly	N/A		
2.9.14*	DV	Entered Correctly	N/A		
2.9.15*	DA	Entered Correctly	N/A		
2.9.16*	DI	Entered Correctly	N/A		
2.9.17*	WW	Entered Correctly	N/A		
2.10.2*	Displacer Level	As read	N/A		
2.10.5*	MZ	Entered Correctly	N/A		
2.10.6*	Water level	As read	N/A		
2.10.7*	DK	2.10.6 –8"	N/A		
2.10.8*	DN	2.10.6 – 11"	N/A		
2.10.11*	SC	988-1008 kg/m^3	N/A		
2.11.8	MOTOR LOCK	Locked		A	

*Densitometer Only

Data Sheet and Test Exception Record Acceptance:

Supervisor/Lead — 5/24/10 Date

Quality Control — 5-24-10 Date

Instrument Tech. — 5-24-10 Date

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TEST EXECUTION DATA SHEET					Page 1 of 2
Date: 5-25-10			Tank Number: AP103-WSTA-LDT-151		
Gauge Serial Number: 854050436			Test Performed by: Jonathan Libbey		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.2.1	EP	EP000	000		
2.2.2	ES	ES0000	0000		
2.2.3	LD	I	I		
2.3.1*	SV	SPU C... or D...	N/A		
2.4.1	DC programmed	As read	+.33792200 E0		
2.4.2	DC engraved	As read	+.337922		
2.4.5	New DC	DC engraved	N/A		
2.5.3	PARAMETERS	Entered Correctly		A	
2.5.6	CA	Displacer raises		A	
2.5.8	RL	850 +/- 0.10	849.99		
2.5.10	RL	850 +/- 0.10	849.99		
2.6.4	BU	As read	+.2257861 7E3		
2.6.5	BV	As read	+.22355983E3		
2.6.6	BW	As read	+.22440209 E3		
2.6.7	BU – BV	0 +/- 3 grams	+2.22634		
2.7.9	F0	As read	+.1140903 4E5		
2.7.11	F1	As read	+.12215096E5		
2.7.13	F2	As read	+.1296777 5E5		
2.7.15	F3	As read	+.1367062 3E5		
2.8.5	WQ Test Weight	225 +/- 3 grams	+.22626855E3		
2.8.6	WQ – 225	0 +/- 3 grams	+1.26855		
2.8.9	Displacer Weight Engraved/Marked	As read	221.4		
2.8.12	WQ Displacer	As read	+.22621915 E3		
2.8.13	(2.8.12)-(2.8.9)	0 +/- 6 grams	+4.81915		

*Densitometer Only

CONTINUED ON NEXT PAGE

TEST EXECUTION DATA SHEET			Page 2 of 2		
Date:			Tank Number: AP103-WSTA-LDT-151		
Gauge Serial Number:			Test Performed by:		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.9.6*	I	Density Display	N/A		
2.9.10*	B	Level Display	N/A		
2.9.12*	DW	Entered Correctly	N/A		
2.9.13*	S1	Entered Correctly	N/A		
2.9.14*	DV	Entered Correctly	N/A		
2.9.15*	DA	Entered Correctly	N/A		
2.9.16*	DI	Entered Correctly	N/A		
2.9.17*	WW	Entered Correctly	N/A		
2.10.2*	Displacer Level	As read	N/A		
2.10.5*	MZ	Entered Correctly	N/A		
2.10.6*	Water level	As read	N/A		
2.10.7*	DK	2.10.6 –8"	N/A		
2.10.8*	DN	2.10.6 – 11"	N/A		
2.10.11*	SC	988-1008 kg/m^3	N/A		
2.11.8	MOTOR LOCK	Locked		A	

*Densitometer Only

Data Sheet and Test Exception Record Acceptance:

Supervisor/Lead — 5/25/10 Date

Quality Control — 5-25-10 Date

Instrument Tech — 5-25-10 Date

TEST EXECUTION DATA SHEET					Page 1 of 2
Date: 9/25/10			Tank Number: AP103-WSTA-LOT-152		
Gauge Serial Number: 85405044 8			Test Performed by: Mike Jungers		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.2.1	EP	EP000	000		
2.2.2	ES	ES0000	0000		
2.2.3	LD	I	I		
2.3.1*	SV	SPU C... or D...	N/A		
2.4.1	DC programmed	As read	+.33802200 E0		
2.4.2	DC engraved	As read	.338022		
2.4.5	New DC	DC engraved	N/A		
2.5.3	PARAMETERS	Entered Correctly		A	
2.5.6	CA	Displacer raises		A	
2.5.8	RL	850 +/- 0.10	850		
2.5.10	RL	850 +/- 0.10	850		
2.6.4	BU	As read	+. 22550089 E5		
2.6.5	BV	As read	+. 22514447 E5		
2.6.6	BW	As read	+. 22525340 E5		
2.6.7	BU – BV	0 +/- 3 grams	+ 0.35672		
2.7.9	F0	As read	+.11379733 E5		
2.7.11	F1	As read	+. 12158836 E5		
2.7.13	F2	As read	+. 12893941 E5		
2.7.15	F3	As read	+. 13590086 E5		
2.8.5	WQ Test Weight	225 +/- 3 grams	+. 225 33050 E3		
2.8.6	WQ – 225	0 +/- 3 grams	.33050		
2.8.9	Displacer Weight Engraved/Marked	As read	222.4		
2.8.12	WQ Displacer	As read	+. 22601817 E5		
2.8.13	(2.8.12)-(2.8.9)	0 +/- 6 grams	+3.61817		

*Densitometer Only

CONTINUED ON NEXT PAGE

TEST EXECUTION DATA SHEET			Page 2 of 2		
Date:			**Tank Number:** AP103-WSTA-LOT-152		
Gauge Serial Number:			**Test Performed by:**		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.9.6*	I	Density Display	N/A		
2.9.10*	B	Level Display	N/A		
2.9.12*	DW	Entered Correctly	N/A		
2.9.13*	S1	Entered Correctly	N/A		
2.9.14*	DV	Entered Correctly	N/A		
2.9.15*	DA	Entered Correctly	N/A		
2.9.16*	DI	Entered Correctly	N/A		
2.9.17*	WW	Entered Correctly	N/A		
2.10.2*	Displacer Level	As read	N/A		
2.10.5*	MZ	Entered Correctly	N/A		
2.10.6*	Water level	As read	N/A		
2.10.7*	DK	2.10.6 –8"	N/A		
2.10.8*	DN	2.10.6 – 11"	N/A		
2.10.11*	SC	988-1008 kg/m^3	N/A		
2.11.8	MOTOR LOCK	Locked		A	

*Densitometer Only

Data Sheet and Test Exception Record Acceptance:

Supervisor/Lead — 5/25/10 Date

Quality Control — 5.25.10 Date

Instrument Tech. — 5/25/10 Date

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TEST EXECUTION DATA SHEET					Page 1 of 2
Date: 5/25/10			Tank Number: AP103-WSTA-LDT-153		
Gauge Serial Number: 85405D444			Test Performed by: Weinbender / Gooch		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.2.1	EP	EP000	EP000		
2.2.2	ES	ES0000	ES0000		
2.2.3	LD	I	I		
2.3.1*	SV	SPU C... or D...	N/A		
2.4.1	DC programmed	As read	.33779100E+0		
2.4.2	DC engraved	As read	337.791		
2.4.5	New DC	DC engraved	N/A		
2.5.3	PARAMETERS	Entered Correctly	YES	A	
2.5.6	CA	Displacer raises	YES	A	
2.5.8	RL	850 +/- 0.10	849.99		
2.5.10	RL	850 +/- 0.10	850.00		
2.6.4	BU	As read	.22759278E+3		
2.6.5	BV	As read	.22615160E+3		
2.6.6	BW	As read	.22693004E+3		
2.6.7	BU – BV	0 +/- 3 grams	1.44118		
2.7.9	F0	As read	.11527019E+5		
2.7.11	F1	As read	.12329752E+5		
2.7.13	F2	As read	.13069975E+5		
2.7.15	F3	As read	.13767686E+5		
2.8.5	WQ Test Weight	225 +/- 3 grams	.22488131E+3		
2.8.6	WQ – 225	0 +/- 3 grams	.11869		
2.8.9	Displacer Weight Engraved/Marked	As read	223.0		
2.8.12	WQ Displacer	As read	.22587396E+3		
2.8.13	(2.8.12)-(2.8.9)	0 +/- 6 grams	2.87396		

*Densitometer Only

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TEST EXECUTION DATA SHEET			Page 2 of 2		
Date:			Tank Number: AP 103-WSTA- 6DT-153		
Gauge Serial Number:			Test Performed by:		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.9.6*	I	Density Display	N/A		
2.9.10*	B	Level Display	N/A		
2.9.12*	DW	Entered Correctly	N/A		
2.9.13*	S1	Entered Correctly	N/A		
2.9.14*	DV	Entered Correctly	N/A		
2.9.15*	DA	Entered Correctly	N/A		
2.9.16*	DI	Entered Correctly	N/A		
2.9.17*	WW	Entered Correctly	N/A		
2.10.2*	Displacer Level	As read	N/A		
2.10.5*	MZ	Entered Correctly	N/A		
2.10.6*	Water level	As read	N/A		
2.10.7*	DK	2.10.6 –8"	N/A		
2.10.8*	DN	2.10.6 – 11"	N/A		
2.10.11*	SC	988-1008 kg/m^3	N/A		
2.11.8	MOTOR LOCK	Locked		A	

*Densitometer Only

Data Sheet and Test Exception Record Acceptance:

Supervisor/Lead — 5/27/10 Date

Quality Control — 5.26.10 Date

Instrument Tech. — 5/24/10 Date

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TEST EXCEPTION RECORD

(This page may be reproduced as necessary)

Gauge S/N: 854050 444 Page ___ of ___

Test Step Number: 2.6.9	Test Exception Number: 2

Test Exception

Description:

INITIAL PASS FAILED BALANCE TEST (BT)

Originator: [signature] Date: 5/26/10

Hold for Resolution: ☐ Continue Test: ☑

Exception Resolution

Description:

REMOVED, CLEANED RESIDUE/DEBRIS FROM DRUM. RETEST PASSED BT ON 3RD ATTEMPT AFTER 2 CLEANINGS.

Retest Required: ☑ Retest Not Required: ☐

Retest Record

Description:

PASSED BT AFTER CLEANING

Concurrence with Resolution:	Resolution Actions / Retest Complete:
Engineer: David Barnes Date: 5/26/10	Supervisor/Lead: [signature] Date: 5/26/10
Quality Assurance: Jon Elliott Date: 5-26-10	Quality Assurance: Jon Elliott Date: 5-26-10

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TEST EXECUTION DATA SHEET					Page 1 of 2
Date: 5-26-10			Tank Number: AP104 - WSTA - LDT - 151		
Gauge Serial Number: 85405026			Test Performed by: Mike Jungers		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.2.1	EP	EP000	EP000		
2.2.2	ES	ES0000	ES0000		
2.2.3	LD	I	I		
2.3.1*	SV	SPU C... or D...	N/A		
2.4.1	DC programmed	As read	.33799300 E+0		
2.4.2	DC engraved	As read	337.993		
2.4.5	New DC	DC engraved	N/A		
2.5.3	PARAMETERS	Entered Correctly	YES	A	
2.5.6	CA	Displacer raises	YES	A	
2.5.8	RL	850 +/- 0.10	849.98		
2.5.10	RL	850 +/- 0.10	849.98		
2.6.4	BU	As read	+ 22855152 E3		
2.6.5	BV	As read	+ 22710350 E3		
2.6.6	BW	As read	+ 22776195 E3		
2.6.7	BU – BV	0 +/- 3 grams	+ 1.44802		
2.7.9	F0	As read	+ 11537051 E5		
2.7.11	F1	As read	+ 1233282 E5		
2.7.13	F2	As read	+ 1307534 E5		
2.7.15	F3	As read	+ 1377319 E5		
2.8.5	WQ Test Weight	225 +/- 3 grams	+ 22481343 E3		
2.8.6	WQ – 225	0 +/- 3 grams	-.0.18657		
2.8.9	Displacer Weight Engraved/Marked	As read	222.4		
2.8.12	WQ Displacer	As read	+ 22534389 E3		
2.8.13	(2.8.12)-(2.8.9)	0 +/- 6 grams	2.94589		

*Densitometer Only

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TEST EXECUTION DATA SHEET			Page 2 of 2		
Date:			**Tank Number:** AP104-WSTALOT-151		
Gauge Serial Number:			**Test Performed by:**		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.9.6*	I	Density Display	N/A		
2.9.10*	B	Level Display	N/A		
2.9.12*	DW	Entered Correctly	N/A		
2.9.13*	S1	Entered Correctly	N/A		
2.9.14*	DV	Entered Correctly	N/A		
2.9.15*	DA	Entered Correctly	N/A		
2.9.16*	DI	Entered Correctly	N/A		
2.9.17*	WW	Entered Correctly	N/A		
2.10.2*	Displacer Level	As read	N/A		
2.10.5*	MZ	Entered Correctly	N/A		
2.10.6*	Water level	As read	N/A		
2.10.7*	DK	2.10.6 –8"	N/A		
2.10.8*	DN	2.10.6 – 11"	N/A		
2.10.11*	SC	988-1008 kg/m^3	N/A		
2.11.8	MOTOR LOCK	Locked		A	

*Densitometer Only

Data Sheet and Test Exception Record Acceptance:

Supervisor/Lead — Date: 5/27/10

Quality Control: Jon Elliott — Date: 5.26.10

Instrument Tech. — Date: 5/26/10

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TEST EXECUTION DATA SHEET					Page 1 of 2
Date: 05-26-10			Tank Number: AP104 - WSTA - LDT-152		
Gauge Serial Number: 854050425			Test Performed by: DAVE DENSON		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.2.1	EP	EP000	EP 000		
2.2.2	ES	ES0000	ES 0000		
2.2.3	LD	I	I		
2.3.1*	SV	SPU C... or D...	N/A		
2.4.1	DC programmed	As read	.33807500 E+0		
2.4.2	DC engraved	As read	338.075		
2.4.5	New DC	DC engraved	N/A		
2.5.3	PARAMETERS	Entered Correctly	YES	A	
2.5.6	CA	Displacer raises	YES	A	
2.5.8	RL	850 +/- 0.10	850.00		
2.5.10	RL	850 +/- 0.10	850.00		
2.6.4	BU	As read	+.22628946 E+3		
2.6.5	BV	As read	+.22386460 E+3		
2.6.6	BW	As read	+.22506003 E+3		
2.6.7	BU – BV	0 +/- 3 grams	+2.42486		
2.7.9	F0	As read	+.11602158 E+5		
2.7.11	F1	As read	+.12398428 E+5		
2.7.13	F2	As read	+.13141645 E+5		
2.7.15	F3	As read	+.13840743 E+5		
2.8.5	WQ Test Weight	225 +/- 3 grams	+.22474295 E+3		
2.8.6	WQ – 225	0 +/- 3 grams	-0.25705		
2.8.9	Displacer Weight Engraved/Marked	As read	222.3		
2.8.12	WQ Displacer	As read	+.22467122 E+3		
2.8.13	(2.8.12)-(2.8.9)	0 +/- 6 grams	+2.37122		

*Densitometer Only

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TEST EXECUTION DATA SHEET			Page 2 of 2		
Date:			Tank Number: AP 104-WSTA-LDT-152		
Gauge Serial Number:			Test Performed by:		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.9.6*	I	Density Display	N/A		
2.9.10*	B	Level Display	N/A		
2.9.12*	DW	Entered Correctly	N/A		
2.9.13*	S1	Entered Correctly	N/A		
2.9.14*	DV	Entered Correctly	N/A		
2.9.15*	DA	Entered Correctly	N/A		
2.9.16*	DI	Entered Correctly	N/A		
2.9.17*	WW	Entered Correctly	N/A		
2.10.2*	Displacer Level	As read	N/A		
2.10.5*	MZ	Entered Correctly	N/A		
2.10.6*	Water level	As read	N/A		
2.10.7*	DK	2.10.6 –8"	N/A		
2.10.8*	DN	2.10.6 – 11"	N/A		
2.10.11*	SC	988-1008 kg/m^3	N/A		
2.11.8	MOTOR LOCK	Locked		A	

*Densitometer Only

Data Sheet and Test Exception Record Acceptance:

Supervisor/Lead — 5/27/10 Date

Quality Control — 5.26.10 Date

Instrument Tech. — 05-26-10 Date

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TEST EXECUTION DATA SHEET					Page 1 of 2
Date: 5/27/10			Tank Number: AP 104-WSTA-LOT-153		
Gauge Serial Number: 854050443			Test Performed by: Jon Libbey		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.2.1	EP	EP000	000		
2.2.2	ES	ES0000	0000		
2.2.3	LD	I	I		
2.3.1*	SV	SPU C... or D...	N/A		
2.4.1	DC programmed	As read	+.33799800E0		
2.4.2	DC engraved	As read	337.998		
2.4.5	New DC	DC engraved	N/A		
2.5.3	PARAMETERS	Entered Correctly		A	
2.5.6	CA	Displacer raises		A	
2.5.8	RL	850 +/- 0.10	849.99		
2.5.10	RL	850 +/- 0.10	849.99		
2.6.4	BU	As read	+.22601594E3		
2.6.5	BV	As read	+.22423879E3		
2.6.6	BW	As read	+.22494365E3		
2.6.7	BU – BV	0 +/- 3 grams	+1.77715		
2.7.9	F0	As read	+.11581234E6		
2.7.11	F1	As read	+.12374003E5		
2.7.13	F2	As read	+.13113734E5		
2.7.15	F3	As read	+.13810381E5		
2.8.5	WQ Test Weight	225 +/- 3 grams	+.22524787E3		
2.8.6	WQ – 225	0 +/- 3 grams	+0.24787		
2.8.9	Displacer Weight Engraved/Marked	As read	222.5		
2.8.12	WQ Displacer	As read	+.22597466E3		
2.8.13	(2.8.12)-(2.8.9)	0 +/- 6 grams	+3.47466		

*Densitometer Only

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TEST EXECUTION DATA SHEET			Page 2 of 2		
Date:			**Tank Number:** AP104-WSTA-LOT-153		
Gauge Serial Number:			**Test Performed by:**		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.9.6*	I	Density Display	N/A		
2.9.10*	B	Level Display	N/A		
2.9.12*	DW	Entered Correctly	N/A		
2.9.13*	S1	Entered Correctly	N/A		
2.9.14*	DV	Entered Correctly	N/A		
2.9.15*	DA	Entered Correctly	N/A		
2.9.16*	DI	Entered Correctly	N/A		
2.9.17*	WW	Entered Correctly	N/A		
2.10.2*	Displacer Level	As read	N/A		
2.10.5*	MZ	Entered Correctly	N/A		
2.10.6*	Water level	As read	N/A		
2.10.7*	DK	2.10.6 –8"	N/A		
2.10.8*	DN	2.10.6 – 11"	N/A		
2.10.11*	SC	988-1008 kg/m^3	N/A		
2.11.8	MOTOR LOCK	Locked		A	

*Densitometer Only

Data Sheet and Test Exception Record Acceptance:

Supervisor/Lead — 5/27/10 Date

Quality Control — 5.27.10 Date

Instrument Tech — 5-27-10 Date

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TEST EXECUTION DATA SHEET					Page 1 of 2
Date: 05-27-10			Tank Number: AP105-WSTA-LDT-151		
Gauge Serial Number: 85405046			Test Performed by: DAVE DENSON		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.2.1	EP	EP000	EP000		
2.2.2	ES	ES0000	ES0000		
2.2.3	LD	I	I		
2.3.1*	SV	SPU C... or D...	N/A		
2.4.1	DC programmed	As read	+.33803400+E0		
2.4.2	DC engraved	As read	338.034		
2.4.5	New DC	DC engraved	N/A		
2.5.3	PARAMETERS	Entered Correctly	YES	A	
2.5.6	CA	Displacer raises	YES	A	
2.5.8	RL	850 +/- 0.10	849.99		
2.5.10	RL	850 +/- 0.10	849.99		
2.6.4	BU	As read	+.22847019+E3		
2.6.5	BV	As read	+.22672508+E3		
2.6.6	BW	As read	+.22764209+E3		
2.6.7	BU – BV	0 +/- 3 grams	+ 1.74511		
2.7.9	F0	As read	+.11456229+E5		
2.7.11	F1	As read	+.12253449+E5		
2.7.13	F2	As read	+.13000569+E5		
2.7.15	F3	As read	+.13700216+E5		
2.8.5	WQ Test Weight	225 +/- 3 grams	+.22416663+E3		
2.8.6	WQ – 225	0 +/- 3 grams	- 0.83337		
2.8.9	Displacer Weight Engraved/Marked	As read	222.4		
2.8.12	WQ Displacer	As read	+.22471103 E3		
2.8.13	(2.8.12)-(2.8.9)	0 +/- 6 grams	+2.31103		

*Densitometer Only

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TEST EXECUTION DATA SHEET			Page 2 of 2		
Date:			**Tank Number:** AP105-WSTA-LOT-151		
Gauge Serial Number:			**Test Performed by:**		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.9.6*	I	Density Display	N/A		
2.9.10*	B	Level Display	N/A		
2.9.12*	DW	Entered Correctly	N/A		
2.9.13*	S1	Entered Correctly	N/A		
2.9.14*	DV	Entered Correctly	N/A		
2.9.15*	DA	Entered Correctly	N/A		
2.9.16*	DI	Entered Correctly	N/A		
2.9.17*	WW	Entered Correctly	N/A		
2.10.2*	Displacer Level	As read	N/A		
2.10.5*	MZ	Entered Correctly	N/A		
2.10.6*	Water level	As read	N/A		
2.10.7*	DK	2.10.6 –8"	N/A		
2.10.8*	DN	2.10.6 – 11"	N/A		
2.10.11*	SC	988-1008 kg/m^3	N/A		
2.11.8	MOTOR LOCK	Locked	YES		

*Densitometer Only

Data Sheet and Test Exception Record Acceptance:

Supervisor/Lead — 5/27/10 Date

Quality Control — 5.27.10 Date

Instrument Tech. — 05-27-10 Date

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TEST EXECUTION DATA SHEET					Page 1 of 2
Date: 5-27-10			Tank Number: AP105-WSTA-LDT-152		
Gauge Serial Number: 85 584050441			Test Performed by: Jon Libbey		
Reference Sequence	**Attribute** JV 5-27-10	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.2.1	EP	EP000	000		
2.2.2	ES	ES0000	0000		
2.2.3	LD	I	I		
2.3.1*	SV	SPU C... or D...	N/A		
2.4.1	DC programmed	As read	+.3379830OE0		
2.4.2	DC engraved	As read	337.983		
2.4.5	New DC	DC engraved	N/A		
2.5.3	PARAMETERS	Entered Correctly		A	
2.5.6	CA	Displacer raises		A	
2.5.8	RL	850 +/- 0.10	849.99		
2.5.10	RL	850 +/- 0.10	850.00		
2.6.4	BU	As read	+.22733646E3		
2.6.5	BV	As read	+.22599030E3		
2.6.6	BW	As read	+.22661390E3		
2.6.7	BU – BV	0 +/- 3 grams	+1.34616		
2.7.9	F0	As read	+.1142342HE5		
2.7.11	F1	As read	+.12259303E5		
2.7.13	F2	As read	+.13027787E5		
2.7.15	F3	As read	+.13743740E5		
2.8.5	WQ Test Weight	225 +/- 3 grams	+.22579086E3		
2.8.6	WQ – 225	0 +/- 3 grams	+0.79086		
2.8.9	Displacer Weight Engraved/Marked	As read	222.9		
2.8.12	WQ Displacer	As read	+.22681818E3		
2.8.13	(2.8.12)-(2.8.9)	0 +/- 6 grams	+3.91818		

*Densitometer Only

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TEST EXECUTION DATA SHEET			Page 2 of 2		
Date:			**Tank Number:** AP105-WSTA-LDT-152		
Gauge Serial Number:			**Test Performed by:**		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.9.6*	I	Density Display	N/A		
2.9.10*	B	Level Display	N/A		
2.9.12*	DW	Entered Correctly	N/A		
2.9.13*	SI	Entered Correctly	N/A		
2.9.14*	DV	Entered Correctly	N/A		
2.9.15*	DA	Entered Correctly	N/A		
2.9.16*	DI	Entered Correctly	N/A		
2.9.17*	WW	Entered Correctly	N/A		
2.10.2*	Displacer Level	As read	N/A		
2.10.5*	MZ	Entered Correctly	N/A		
2.10.6*	Water level	As read	N/A		
2.10.7*	DK	2.10.6 –8"	N/A		
2.10.8*	DN	2.10.6 – 11"	N/A		
2.10.11*	SC	988-1008 kg/m^3	N/A		
2.11.8	MOTOR LOCK	Locked		A	

*Densitometer Only

Data Sheet and Test Exception Record Acceptance:

Supervisor/Lead — 5/27/10 Date

Quality Control — 5-27-10 Date

Instrument Tech — 5-27-10 Date

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TEST EXECUTION DATA SHEET					Page 1 of 2
Date: 6/1/10			Tank Number: AP-105-WSTA-LOT-153		
Gauge Serial Number: 8 540 504 38			Test Performed by: Mike Sungers		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.2.1	EP	EP000	000		
2.2.2	ES	ES0000	0000		
2.2.3	LD	I	I		
2.3.1*	SV	SPU C... or D...	N/A		
2.4.1	DC programmed	As read	+.3380/200 E0		
2.4.2	DC engraved	As read	338.012		
2.4.5	New DC	DC engraved	N/A		
2.5.3	PARAMETERS	Entered Correctly	A		
2.5.6	CA	Displacer raises	A		
2.5.8	RL	850 +/- 0.10	850.00		
2.5.10	RL	850 +/- 0.10	850.00		
2.6.4	BU	As read	+.22919711 E3		
2.6.5	BV	As read	+.22687839 E3		
2.6.6	BW	As read	+.22766509 E3		
2.6.7	BU – BV	0 +/- 3 grams	+2.31872		
2.7.9	F0	As read	+.11336304 E5		
2.7.11	F1	As read	+.12133618 E5		
2.7.13	F2	As read	+.12876167 E5		
2.7.15	F3	As read	+.13572729 E5		
2.8.5	WQ Test Weight	225 +/- 3 grams	+.22501408 E3		
2.8.6	WQ – 225	0 +/- 3 grams	+0.01408		
2.8.9	Displacer Weight Engraved/Marked	As read	222.5		
2.8.12	WQ Displacer	As read	+.22571430 E3		
2.8.13	(2.8.12)-(2.8.9)	0 +/- 6 grams	+3.2143		

*Densitometer Only

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TEST EXECUTION DATA SHEET			Page 2 of 2		
Date:			Tank Number: AP105 - WSTA. LOT. 153		
Gauge Serial Number:			Test Performed by:		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.9.6*	I	Density Display	N/A		
2.9.10*	B	Level Display	N/A		
2.9.12*	DW	Entered Correctly	N/A		
2.9.13*	S1	Entered Correctly	N/A		
2.9.14*	DV	Entered Correctly	N/A		
2.9.15*	DA	Entered Correctly	N/A		
2.9.16*	DI	Entered Correctly	N/A		
2.9.17*	WW	Entered Correctly	N/A		
2.10.2*	Displacer Level	As read	N/A		
2.10.5*	MZ	Entered Correctly	N/A		
2.10.6*	Water level	As read	N/A		
2.10.7*	DK	2.10.6 –8"	N/A		
2.10.8*	DN	2.10.6 – 11"	N/A		
2.10.11*	SC	988-1008 kg/m^3	N/A		
2.11.8	MOTOR LOCK	Locked		A	

*Densitometer Only

Data Sheet and Test Exception Record Acceptance:

Supervisor/Lead — 6/1/10 Date

Quality Control — 6-1-10 Date

Instrument Tech. — 6/1/10 Date

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TEST EXECUTION DATA SHEET					Page 1 of 2
Date: 6/1/10			Tank Number: AP106 - WSTA - LOT - 151		
Gauge Serial Number: 854050423			Test Performed by: Mike Jungers		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.2.1	EP	EP000	000		
2.2.2	ES	ES0000	0000		
2.2.3	LD	I	F		
2.3.1*	SV	SPU C... or D...	U/A		
2.4.1	DC programmed	As read	+ 338.06500		
2.4.2	DC engraved	As read	338.065		
2.4.5	New DC	DC engraved	N/A		
2.5.3	PARAMETERS	Entered Correctly		A	
2.5.6	CA	Displacer raises		A	
2.5.8	RL	850 +/- 0.10	850.00		
2.5.10	RL	850 +/- 0.10	850.00		
2.6.4	BU	As read	+ .22658806 E3		
2.6.5	BV	As read	+ 22618931 E3		
2.6.6	BW	As read	+ .22635516 E3		
2.6.7	BU – BV	0 +/- 3 grams	+ 0.39875		
2.7.9	F0	As read	+ .11477071 E5		
2.7.11	F1	As read	+ 12290634 E5		
2.7.13	F2	As read	+ 13045593 E3		
2.7.15	F3	As read	+ 13753323 E3		
2.8.5	WQ Test Weight	225 +/- 3 grams	+ 22515457 E3		
2.8.6	WQ – 225	0 +/- 3 grams	+ 0.15457		
2.8.9	Displacer Weight Engraved/Marked	As read	222.4		
2.8.12	WQ Displacer	As read	+ .22572688 E3		
2.8.13	(2.8.12)-(2.8.9)	0 +/- 6 grams	+ 3.32688		

*Densitometer Only

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TEST EXECUTION DATA SHEET			Page 2 of 2		
Date:			**Tank Number:** AP106-WSTA-LDT-151		
Gauge Serial Number:			**Test Performed by:**		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.9.6*	I	Density Display	N/A		
2.9.10*	B	Level Display	N/A		
2.9.12*	DW	Entered Correctly	N/A		
2.9.13*	S1	Entered Correctly	N/A		
2.9.14*	DV	Entered Correctly	N/A		
2.9.15*	DA	Entered Correctly	N/A		
2.9.16*	DI	Entered Correctly	N/A		
2.9.17*	WW	Entered Correctly	N/A		
2.10.2*	Displacer Level	As read	N/A		
2.10.5*	MZ	Entered Correctly	N/A		
2.10.6*	Water level	As read	N/A		
2.10.7*	DK	2.10.6 –8"	N/A		
2.10.8*	DN	2.10.6 – 11"	N/A		
2.10.11*	SC	988-1008 kg/m^3	N/A		
2.11.8	MOTOR LOCK	Locked		A	

*Densitometer Only

Data Sheet and Test Exception Record Acceptance:

Supervisor/Lead — Date: 6/1/10

Quality Control (Jon Elliott) — Date: 6-1-10

Instrument Tech. — Date: 6/1/10

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TEST EXECUTION DATA SHEET					Page 1 of 2
Date: 6/2/10			Tank Number: AP-106-WSTA-LPTA-152		
Gauge Serial Number: 8540S0439			Test Performed by: Mike Jungers		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.2.1	EP	EP000	000		
2.2.2	ES	ES0000	0000		
2.2.3	LD	I	I		
2.3.1*	SV	SPU C... or D...	N/A		
2.4.1	DC programmed	As read	+.33784600 E0		
2.4.2	DC engraved	As read	337.846		
2.4.5	New DC	DC engraved	N/A		
2.5.3	PARAMETERS	Entered Correctly	A		
2.5.6	CA	Displacer raises	A		
2.5.8	RL	850 +/- 0.10	850.00		
2.5.10	RL	850 +/- 0.10	849.99		
2.6.4	BU	As read	+.22628109 E3		
2.6.5	BV	As read	+.22538588 E3		
2.6.6	BW	As read	+.22588781 E3		
2.6.7	BU – BV	0 +/- 3 grams	+0.89521		
2.7.9	F0	As read	+.11459568 E5		
2.7.11	F1	As read	+.12263562 E5		
2.7.13	F2	As read	+.13012014 E5		
2.7.15	F3	As read	+.13709499 E5		
2.8.5	WQ Test Weight	225 +/- 3 grams	+.22510602 E3		
2.8.6	WQ – 225	0 +/- 3 grams	+0.10602		
2.8.9	Displacer Weight Engraved/Marked	As read	222.8		
2.8.12	WQ Displacer	As read	+.22617176 E3		
2.8.13	(2.8.12)-(2.8.9)	0 +/- 6 grams	+3.37176		

*Densitometer Only

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TEST EXECUTION DATA SHEET			Page 2 of 2		
Date:			Tank Number: AP106-WSTA-LDT-152		
Gauge Serial Number:			Test Performed by:		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.9.6*	I	Density Display	N/A		
2.9.10*	B	Level Display	N/A		
2.9.12*	DW	Entered Correctly	N/A		
2.9.13*	S1	Entered Correctly	N/A		
2.9.14*	DV	Entered Correctly	N/A		
2.9.15*	DA	Entered Correctly	N/A		
2.9.16*	DI	Entered Correctly	N/A		
2.9.17*	WW	Entered Correctly	N/A		
2.10.2*	Displacer Level	As read	N/A		
2.10.5*	MZ	Entered Correctly	N/A		
2.10.6*	Water level	As read	N/A		
2.10.7*	DK	2.10.6 –8"	N/A		
2.10.8*	DN	2.10.6 – 11"	N/A		
2.10.11*	SC	988-1008 kg/m^3	N		
2.11.8	MOTOR LOCK	Locked		A	

*Densitometer Only

Data Sheet and Test Exception Record Acceptance:

Supervisor/Lead — 6/2/10 Date

Quality Control — 6-2-10 Date

Instrument Tech. — 6-2-10 Date

TEST EXECUTION DATA SHEET					Page 1 of 2
Date: 6/2/10			Tank Number: AP106-WSTA-LDT-153		
Gauge Serial Number: 854050445			Test Performed by: NO		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.2.1	EP	EP000	000		
2.2.2	ES	ES0000	0000		
2.2.3	LD	I	I		
2.3.1*	SV	SPU C... or D...	N/A		
2.4.1	DC programmed	As read	33801000 E0		
2.4.2	DC engraved	As read	338010		
2.4.5	New DC	DC engraved	N/A		
2.5.3	PARAMETERS	Entered Correctly	A		
2.5.6	CA	Displacer raises	A		
2.5.8	RL	850 +/- 0.10	849.99		
2.5.10	RL	850 +/- 0.10	849.99		
2.6.4	BU	As read	+.22430123 E3		
2.6.5	BV	As read	+.22353383 E3		
2.6.6	BW	As read	+.22389657 E3		
2.6.7	BU – BV	0 +/- 3 grams	+.40466		
2.7.9	F0	As read	+.11519079 E5		
2.7.11	F1	As read	+.12326608 E5		
2.7.13	F2	As read	+.13074602 E5		
2.7.15	F3	As read	+.13776594 E5		
2.8.5	WQ Test Weight	225 +/- 3 grams	+.22457844 E5		
2.8.6	WQ – 225	0 +/- 3 grams	.42158		
2.8.9	Displacer Weight Engraved/Marked	As read	221.5		
2.8.12	WQ Displacer	As read	.22442747 E3		
2.8.13	(2.8.12)-(2.8.9)	0 +/- 6 grams	2.92747		

*Densitometer Only

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TEST EXECUTION DATA SHEET			Page 2 of 2		
Date:			**Tank Number:** AP106-WSTA-LDT153		
Gauge Serial Number:			**Test Performed by:**		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.9.6*	I	Density Display	N/A		
2.9.10*	B	Level Display	N/A		
2.9.12*	DW	Entered Correctly	N/A		
2.9.13*	S1	Entered Correctly	N/A		
2.9.14*	DV	Entered Correctly	N/A		
2.9.15*	DA	Entered Correctly	N/A		
2.9.16*	DI	Entered Correctly	N/A		
2.9.17*	WW	Entered Correctly	N/A		
2.10.2*	Displacer Level	As read	N/A		
2.10.5*	MZ	Entered Correctly	N/A		
2.10.6*	Water level	As read	N/A		
2.10.7*	DK	2.10.6 –8"	N/A		
2.10.8*	DN	2.10.6 – 11"	N/A		
2.10.11*	SC	988-1008 kg/m^3	N/A		
2.11.8	MOTOR LOCK	Locked		A	

*Densitometer Only

Data Sheet and Test Exception Record Acceptance:

Supervisor/Lead — 6/2/10 Date

Quality Control — 6-2-10 Date

Instrument Tech — 6-2-10 Date

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TEST EXECUTION DATA SHEET					Page 1 of 2
Date: 6/2/10			Tank Number: AP107 - WSTA - LDT-151		
Gauge Serial Number: ~~85405445~~ 85405430			Test Performed by: Mike Jungers		
Reference Sequence	Attribute	Expected Value	Actual Value	A/R	Comment
2.2.1	EP	EP000	000		
2.2.2	ES	ES0000	0000		
2.2.3	LD	I	I		
2.3.1*	SV	SPU C... or D...	N/A		
2.4.1	DC programmed	As read	T. 33793200 E0		
2.4.2	DC engraved	As read	337.932		
2.4.5	New DC	DC engraved	N/A		
2.5.3	PARAMETERS	Entered Correctly	A		
2.5.6	CA	Displacer raises	A		
2.5.8	RL	850 +/- 0.10	849.99		
2.5.10	RL	850 +/- 0.10	849.99		
2.6.4	BU	As read	T. 22463370 E3		
2.6.5	BV	As read	T. 22221460 E3		
2.6.6	BW	As read	T. 22334905 E3		
2.6.7	BU – BV	0 +/- 3 grams	0024		
2.7.9	F0	As read	T. 11466095 E5		
2.7.11	F1	As read	T. 12279247 E5		
2.7.13	F2	As read	~~T. 13028742 E5~~ mf 6/2/10 T. 13028742 E5		
2.7.15	F3	As read	T. 13736967 E5		
2.8.5	WQ Test Weight	225 +/- 3 grams	T. 22684685 E3		
2.8.6	WQ – 225	0 +/- 3 grams	1.84685		
2.8.9	Displacer Weight Engraved/Marked	As read	222.5		
2.8.12	WQ Displacer	As read	T. 22726065 E3		
2.8.13	(2.8.12)-(2.8.9)	0 +/- 6 grams	4.76065		

*Densitometer Only

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TEST EXECUTION DATA SHEET			Page 2 of 2		
Date:			Tank Number: AP107-WSTA-LOT-151		
Gauge Serial Number:			Test Performed by:		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.9.6*	I	Density Display	N/A		
2.9.10*	B	Level Display	N/A		
2.9.12*	DW	Entered Correctly	N/A		
2.9.13*	S1	Entered Correctly	N/A		
2.9.14*	DV	Entered Correctly	N/A		
2.9.15*	DA	Entered Correctly	N/A		
2.9.16*	DI	Entered Correctly	N/A		
2.9.17*	WW	Entered Correctly	N/A		
2.10.2*	Displacer Level	As read	N/A		
2.10.5*	MZ	Entered Correctly	N/A		
2.10.6*	Water level	As read	N/A		
2.10.7*	DK	2.10.6 –8"	N/A		
2.10.8*	DN	2.10.6 – 11"	N/A		
2.10.11*	SC	988-1008 kg/m^3	N/A		
2.11.8	MOTOR LOCK	Locked		A	

*Densitometer Only

Data Sheet and Test Exception Record Acceptance:

Supervisor/Lead — Date: 6/2/10

Quality Control — Date: 6.2.10

Instrument Tech. — Date: 6/2/10

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TEST EXECUTION DATA SHEET					Page 1 of 2
Date: 6/2/10			Tank Number: AP107-WSTA-LDT-152		
Gauge Serial Number: 85405042 7			Test Performed by: MO		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.2.1	EP	EP000	000		
2.2.2	ES	ES0000	0000		
2.2.3	LD	I	I		
2.3.1*	SV	SPU C... or D...	N/A		
2.4.1	DC programmed	As read	+.33797100 E00		
2.4.2	DC engraved	As read	337.971		
2.4.5	New DC	DC engraved	N/A		
2.5.3	PARAMETERS	Entered Correctly		A	
2.5.6	CA	Displacer raises		A	
2.5.8	RL	850 +/- 0.10	950.00		
2.5.10	RL	850 +/- 0.10	850.00		
2.6.4	BU	As read	+.22509946 E3		
2.6.5	BV	As read	+.22400216 E3		
2.6.6	BW	As read	+.22462998 E3		
2.6.7	BU – BV	0 +/- 3 grams	1.09736		
2.7.9	F0	As read	+.11320395 E5		
2.7.11	F1	As read	+.12124237 E5		
2.7.13	F2	As read	+.12866852 E5		
2.7.15	F3	As read	+.13560690 E5		
2.8.5	WQ Test Weight	225 +/- 3 grams	+.22544869 E3		
2.8.6	WQ – 225	0 +/- 3 grams	.44869		
2.8.9	Displacer Weight Engraved/Marked	As read	222.9		
2.8.12	WQ Displacer	As read	.22679506 E3		
2.8.13	(2.8.12)-(2.8.9)	0 +/- 6 grams	3.89506		

*Densitometer Only

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TEST EXECUTION DATA SHEET			Page 2 of 2		
Date:			**Tank Number:** AP107-WSTA.LOT-152		
Gauge Serial Number:			**Test Performed by:**		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.9.6*	I	Density Display	N/A		
2.9.10*	B	Level Display	N/A		
2.9.12*	DW	Entered Correctly	N/A		
2.9.13*	S1	Entered Correctly	N/A		
2.9.14*	DV	Entered Correctly	N/A		
2.9.15*	DA	Entered Correctly	N/A		
2.9.16*	DI	Entered Correctly	N/A		
2.9.17*	WW	Entered Correctly	N/A		
2.10.2*	Displacer Level	As read	N/A		
2.10.5*	MZ	Entered Correctly	N/A		
2.10.6*	Water level	As read	N/A		
2.10.7*	DK	2.10.6 –8"	N/A		
2.10.8*	DN	2.10.6 – 11"	N/A		
2.10.11*	SC	988-1008 kg/m^3	N/A		
2.11.8	MOTOR LOCK	Locked			

*Densitometer Only

Data Sheet and Test Exception Record Acceptance:

Supervisor/Lead — 6/2/10 Date

Quality Control — 6-2-10 Date

Instrument Tech — 6/2/10 Date

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TEST EXECUTION DATA SHEET					Page 1 of 2
Date: 6/3/10			Tank Number: AP107-WSTA-LOT-153		
Gauge Serial Number: 85405447			Test Performed by: Mike Jungers		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.2.1	EP	EP000	000		
2.2.2	ES	ES0000	0000		
2.2.3	LD	I	I		
2.3.1*	SV	SPU C... or D...	N/A		
2.4.1	DC programmed	As read	+.33801600 E0		
2.4.2	DC engraved	As read	338.016		
2.4.5	New DC	DC engraved	N/A		
2.5.3	PARAMETERS	Entered Correctly		A	
2.5.6	CA	Displacer raises		A	
2.5.8	RL	850 +/- 0.10	849.99		
2.5.10	RL	850 +/- 0.10	849.99		
2.6.4	BU	As read	+.22611392 E3		
2.6.5	BV	As read	+.22375219 E3		
2.6.6	BW	As read	+.22497464 E3		
2.6.7	BU – BV	0 +/- 3 grams	2.36174 E5		
2.7.9	F0	As read	+.11459870 E5		
2.7.11	F1	As read	+.12261470 E5		
2.7.13	F2	As read	+.13010200 E5		
2.7.15	F3	As read	+.13709870 E5		
2.8.5	WQ Test Weight	225 +/- 3 grams	+.22488639 E3		
2.8.6	WQ – 225	0 +/- 3 grams	.11361		
2.8.9	Displacer Weight Engraved/Marked	As read	222.41		
2.8.12	WQ Displacer	As read	.22579453 E3		
2.8.13	(2.8.12)-(2.8.9)	0 +/- 6 grams	3.5453		

*Densitometer Only

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TEST EXECUTION DATA SHEET			Page 2 of 2		
Date:			**Tank Number:** AP107_WSTA-LDT-153		
Gauge Serial Number:			**Test Performed by:**		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.9.6*	I	Density Display	N/A		
2.9.10*	B	Level Display	N/A		
2.9.12*	DW	Entered Correctly	N/A		
2.9.13*	S1	Entered Correctly	N/A		
2.9.14*	DV	Entered Correctly	N/A		
2.9.15*	DA	Entered Correctly	N/A		
2.9.16*	DI	Entered Correctly	N/A		
2.9.17*	WW	Entered Correctly	N/A		
2.10.2*	Displacer Level	As read	N/A		
2.10.5*	MZ	Entered Correctly	N/A		
2.10.6*	Water level	As read	N/A		
2.10.7*	DK	2.10.6 –8"	N/A		
2.10.8*	DN	2.10.6 – 11"	N/A		
2.10.11*	SC	988-1008 kg/m^3	N/A		
2.11.8	MOTOR LOCK	Locked		A	

*Densitometer Only

Data Sheet and Test Exception Record Acceptance:

Supervisor/Lead — 6/3/10 Date

Quality Control — 6-3-10 Date

Instrument Tech. — 6/3/10 Date

TEST EXECUTION DATA SHEET					Page 1 of 2
Date: 6/3/10			Tank Number: AP-108-WSTA-LDT-151		
Gauge Serial Number: 854050429			Test Performed by: Mike Jungers		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.2.1	EP	EP000	000		
2.2.2	ES	ES0000	0000		
2.2.3	LD	I	I		
2.3.1*	SV	SPU C... or D...	N/A		
2.4.1	DC programmed	As read	+.337964 E0		
2.4.2	DC engraved	As read	337.964		
2.4.5	New DC	DC engraved	N/A		
2.5.3	PARAMETERS	Entered Correctly		A	
2.5.6	CA	Displacer raises		A	
2.5.8	RL	850 +/- 0.10	849.99		
2.5.10	RL	850 +/- 0.10	849.99		
2.6.4	BU	As read	+.22644753 E3		
2.6.5	BV	As read	+.22516639 E3		
2.6.6	BW	As read	+.22567077 E3		
2.6.7	BU – BV	0 +/- 3 grams	1.28114		
2.7.9	F0	As read	+.11344972 E5		
2.7.11	F1	As read	+.12150109 E5		
2.7.13	F2	As read	+.12897075 E5		
2.7.15	F3	As read	+.13596626 E5		
2.8.5	WQ Test Weight	225 +/- 3 grams	.22495694 E3		
2.8.6	WQ – 225	0 +/- 3 grams	-.403		
2.8.9	Displacer Weight Engraved/Marked	As read	223.1		
2.8.12	WQ Displacer	As read	2263156 E3		
2.8.13	(2.8.12)-(2.8.9)	0 +/- 6 grams	3.0856		

*Densitometer Only

CONTINUED ON NEXT PAGE

TEST EXECUTION DATA SHEET			Page 2 of 2		
Date:			**Tank Number:** AP108-WSTA-LOT-151		
Gauge Serial Number:			**Test Performed by:**		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.9.6*	I	Density Display	N/A		
2.9.10*	B	Level Display	N/A		
2.9.12*	DW	Entered Correctly	N/A		
2.9.13*	S1	Entered Correctly	N/A		
2.9.14*	DV	Entered Correctly	N/A		
2.9.15*	DA	Entered Correctly	N/A		
2.9.16*	DI	Entered Correctly	N/A		
2.9.17*	WW	Entered Correctly	N/A		
2.10.2*	Displacer Level	As read	N/A		
2.10.5*	MZ	Entered Correctly	N/A		
2.10.6*	Water level	As read	N/A		
2.10.7*	DK	2.10.6 –8"	N/A		
2.10.8*	DN	2.10.6 – 11"	N/A		
2.10.11*	SC	988-1008 kg/m^3	N/A		
2.11.8	MOTOR LOCK	Locked		A	

*Densitometer Only

Data Sheet and Test Exception Record Acceptance:

Supervisor/Lead — 6/3/10 Date

Quality Control — 6.3.10 Date

Instrument Tech. — 6/3/10 Date

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TEST EXECUTION DATA SHEET					Page 1 of 2
Date: 6/4/10			Tank Number: AP108-WSTA-LD7-152		
Gauge Serial Number: 854050440			Test Performed by: Mike Jungers		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.2.1	EP	EP000	000		
2.2.2	ES	ES0000	0000		
2.2.3	LD	I	I		
2.3.1*	SV	SPU C... or D...	N/A		
2.4.1	DC programmed	As read	+.33797600 E0		
2.4.2	DC engraved	As read	337.976		
2.4.5	New DC	DC engraved	N/A		
2.5.3	PARAMETERS	Entered Correctly		A	
2.5.6	CA	Displacer raises		A	
2.5.8	RL	850 +/- 0.10	849.99		
2.5.10	RL	850 +/- 0.10	849.99		
2.6.4	BU	As read	+.22677633 E3		
2.6.5	BV	As read	+.22512788 E3		
2.6.6	BW	As read	+.22595103 E3		
2.6.7	BU – BV	0 +/- 3 grams	+1.64845		
2.7.9	F0	As read	+.11451185 E5		
2.7.11	F1	As read	+.12244376 E5		
2.7.13	F2	As read	+.12984431 E5		
2.7.15	F3	As read	+.13676450 E5		
2.8.5	WQ Test Weight	225 +/- 3 grams	+.22495886 E3		
2.8.6	WQ – 225	0 +/- 3 grams	-0.04114		
2.8.9	Displacer Weight Engraved/Marked	As read	222.4		
2.8.12	WQ Displacer	As read	+.22558658 E3		
2.8.13	(2.8.12)-(2.8.9)	0 +/- 6 grams	3.18558		

*Densitometer Only

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TEST EXECUTION DATA SHEET			Page 2 of 2		
Date:			**Tank Number:** AP108-WSTA-LOT-152		
Gauge Serial Number:			**Test Performed by:**		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.9.6*	I	Density Display	N/A		
2.9.10*	B	Level Display	N/A		
2.9.12*	DW	Entered Correctly	N/A		
2.9.13*	S1	Entered Correctly	N/A		
2.9.14*	DV	Entered Correctly	N/A		
2.9.15*	DA	Entered Correctly	N/A		
2.9.16*	DI	Entered Correctly	N/A		
2.9.17*	WW	Entered Correctly	N/A		
2.10.2*	Displacer Level	As read	N/A		
2.10.5*	MZ	Entered Correctly	N/A		
2.10.6*	Water level	As read	N/A		
2.10.7*	DK	2.10.6 –8"	N/A		
2.10.8*	DN	2.10.6 – 11"	N/A		
2.10.11*	SC	988-1008 kg/m^3	N/A		
2.11.8	MOTOR LOCK	Locked		A	

*Densitometer Only

Data Sheet and Test Exception Record Acceptance:

MH — 6/4/10
Supervisor/Lead — Date

Jon Elliott — 6-4-10
Quality Control — Date

MD — 6/4/10
Instrument Tech — Date

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TEST EXECUTION DATA SHEET					Page 1 of 2
Date: 6/4/10			Tank Number: AP-108-WSTA-LOT-153		
Gauge Serial Number: 85405442			Test Performed by: Mike Sungers		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.2.1	EP	EP000	000		
2.2.2	ES	ES0000	0000		
2.2.3	LD	I	F		
2.3.1*	SV	SPU C... or D...	N/A		
2.4.1	DC programmed	As read	+.33792700 E0		
2.4.2	DC engraved	As read	337.927		
2.4.5	New DC	DC engraved	N/A		
2.5.3	PARAMETERS	Entered Correctly		A	
2.5.6	CA	Displacer raises		A	
2.5.8	RL	850 +/- 0.10	850.00		
2.5.10	RL	850 +/- 0.10	849.99		
2.6.4	BU	As read	+.22664615 E3		
2.6.5	BV	As read	+.22432917 E3		
2.6.6	BW	As read	+.22517638 E3		
2.6.7	BU – BV	0 +/- 3 grams	2.31698		
2.7.9	F0	As read	+.11521904 E5		
2.7.11	F1	As read	+.12304244 E5		
2.7.13	F2	As read	+.13039769 E5		
2.7.15	F3	As read	+.13727436 E5		
2.8.5	WQ Test Weight	225 +/- 3 grams	+.2247841 E3		
2.8.6	WQ – 225	0 +/- 3 grams	-.0258		
2.8.9	Displacer Weight Engraved/Marked	As read	222.3		
2.8.12	WQ Displacer	As read	+.22524283 E5		
2.8.13	(2.8.12)-(2.8.9)	0 +/- 6 grams	+2.94283		

*Densitometer Only

CONTINUED ON NEXT PAGE

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TEST EXECUTION DATA SHEET			Page 2 of 2		
Date:			**Tank Number:** AP108-WSTA-LOT-153		
Gauge Serial Number:			**Test Performed by:**		
Reference Sequence	**Attribute**	**Expected Value**	**Actual Value**	**A/R**	**Comment**
2.9.6*	I	Density Display	N/A		
2.9.10*	B	Level Display	N/A		
2.9.12*	DW	Entered Correctly	N/A		
2.9.13*	S1	Entered Correctly	N/A		
2.9.14*	DV	Entered Correctly	N/A		
2.9.15*	DA	Entered Correctly	N/A		
2.9.16*	DI	Entered Correctly	N/A		
2.9.17*	WW	Entered Correctly	N/A		
2.10.2*	Displacer Level	As read	N/A		
2.10.5*	MZ	Entered Correctly	N/A		
2.10.6*	Water level	As read	N/A		
2.10.7*	DK	2.10.6 –8"	N/A		
2.10.8*	DN	2.10.6 – 11"	N/A		
2.10.11*	SC	988-1008 kg/m^3	N/A		
2.11.8	MOTOR LOCK	Locked		A	

*Densitometer Only

Data Sheet and Test Exception Record Acceptance:

Supervisor/Lead — 6/4/10 Date

Quality Control — 6-4-10 Date

Instrument Tech. — 6/4/10 Date

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CH2M HILL ENGINEERING CHANGE NOTICE

Page 1 of 3 ☒ DM ☐ FM ☐ TM

1a. ECN 723181 R 0

1b. Proj. ECN N/A - - R

2. Simple Modification ☒ Yes ☐ No	3. Design Inputs – For full ECNs, record information on the ECN-1 Form (not required for Simple Modifications)		4. Date May 24, 2005
5. Originator's Name, Organization, MSIN, & Phone No. William E. Willingham Jr., COGEMA Engineering Corporation, H3-28, 373-6256		6. USQ Number No. - - - R - ☒ N/A	7. Related ECNs N/A
8. Title Revision of HNF-SD-WM-ATP-077, ENRAF shop ATP	9. Bldg. / Facility No. 200-G	10. Equipment / Component ID LIT, DIT	11. Approval Designator N/A
12. Engineering Documents/Drawings to be Changed (Incl. Sheet & Rev. Nos.) HNF-SD-WM-ATP-077, Revision 9		13. Safety Designation ☐ SC ☐ SS ☐ GS ☒ N/A	14. Expedited/Off-Shift ECN? ☐ Yes ☒ No
15a. Work Package Number N/A	15b. Modification Work Completed N/A (Responsible Engineer / Date)	15c. Restored to Original Status (TM) N/A (Responsible Engineer / Date)	16. Fabrication Support ECN? ☐ Yes ☒ No

17. Description of the Change (Use ECN Continuation pages as needed)

This ECN releases Revision 10 of HNF-SD-WM-ATP-077, "ENRAF Series 854 Advanced Technology Gauge (ATG) Acceptance Test Procedure".

Problem: The acceptance criteria of Revision 9's Density Measurement Test has been too stringent, making it necessary to take exceptions to the test in order to pass the test. Also, there are a couple of errors in Revision 9 that need correcting.

Solution: Correct the errors in Revision 9 and broaden the acceptance criteria for passing the Density Measurement Test.

Analysis: The changes made in this revision and the reasons therefore are documented starting on Page 3.

18. Justification of the Change (Use ECN Continuation pages as needed)

The acceptance criteria for the Density Measurement Test in Revision 9 was too stringent, and had known errors in it. The changes made by Revision 10 will make the procedure more workable.

This activity is proactive work that is required to maintain and preserve the facility, structures and systems, or components within them in a condition suitable for performing their designated purpose. Therefore it meets the definition of a maintenance activity and does not require entry into the USQ process, or documentation of a USQ evaluation." .

19. ECN Category

☒ Direct Revision
☐ Supplemental
☐ Void/Cancel

ECN Type

☐ Supercedure
☐ Revision

20. Distribution

Name	MSIN	Name	MSIN
WE Willingham Jr.	H3-28	DA Barnes	R1-14
PF Ulk	R3-26		
MA Roberts	S5-07		
BK Everett	S5-07		
BH Thacker	S5-07		
ME Lewis	R3-78		
DJ Born	R3-26	^CH2M EQRG	R1-14

Release Stamp

MAY 31 2005
DATE:
HANFORD RELEASE
ID: 21
STA:

A-6003-563.1 (09/04)

CH2M HILL ENGINEERING CHANGE NOTICE	1a. ECN 723181 R 0
Page 2 of 3 ☒ DM ☐ FM ☐ TM	1b. Proj. ECN N/A - - R

21. **Revisions Planned** (Include a brief description of the contents of each revision)
None

Note: All revisions shall have the approvals of the affected organizations as identified in block 11 "Approval Designator," on page 1 of this ECN.

22. **Design Basis Documents**
☐ Yes ☒ No

23. **Commercial Grade Item Dedication Numbers** (associated with this design change)
N/A

24. **Engineering Data Transmittal Numbers** (associated with this design change, e.g., new drawings, new documents)
N/A

25. **Other Non Engineering (not in HDCS) documents that need to be modified due to this change**

Type of Document	Document Number	Update Completed On	Responsible Engineer (print/sign and date)
Alarm Response Procedure	N/A		
Operations Procedure	N/A		
Maintenance Procedure	N/A		

Type of Document	Document Number	Type of Document	Document Number
N/A			

26. **Field Change Notice(s) Used?**
☐ Yes ☒ No
If Yes, Record Information on the ECN-2 Form, attach form(s), include a description of the interim resolution on ECN Page 1, block 17, and identify permanent changes.

NOTE: ECNs are required to record and approve all FCNs issued. If the FCNs have not changed the original design media then they are just incorporated into the design media via an ECN. If the FCN did change the original design media then the ECN will include the necessary engineering changes to the original design media.

27. **Design Verification Required?**
☐ Yes ☒ No
If Yes, as a minimum attach the one page checklist from TFC-ENG-DESIGN-P-17.

28. **Approvals**

Facility/Project Signatures		Date	A/E Signatures		Date
Design Authority			Originator/Design Agent		
Resp. Engineer	WE Willingham Jr.	5/24/05	Professional Engineer		
Resp. Manager	BH Thacker	5-27-05	Project Engineer		
Quality Assurance			Quality Assurance		
IS&H Engineer			Safety		
NS&L Engineer			Designer		
Environ. Engineer			Environ. Engineer		
Engineering Checker	BK Everett	5/24/05	Other		
Other			Other		
Other			DEPARTMENT OF ENERGY / OFFICE OF RIVER PROTECTION		
Other			Signature or a Control Number that tracks the Approval Signature		
Other					
Other			ADDITIONAL SIGNATURES		
Other					
Other					

CH2M HILL ENGINEERING CHANGE NOTICE CONTINUATION SHEET	1a. ECN 723181 R 0
Page 3 of 3	1b. Proj. ECN N/A - - R

Document/Drawing No. N/A Sheet N/A Revision N/A

Analysis, continued from Block 17.

The changes made in Revision 10 and their justifications are listed below.

1.) Step 1.6 is changed from "Test Conditions and Equipment Required" to "Test Conditions and Required Equipment". Editorial comment/change.

2.) Step 1.7 is changed from "Criteria" to "Acceptance Criteria". Editorial comment/change.

3.) Step 1.9.2 is modified to state that checking of the drum balance is required if the drum has been dropped on a hard surface. This is more practical than just discarding the drum, if dropped.

4.) The level dimension value (LD) is verified in step 2.2.3 and recorded on the data sheet. This value was previously verified, but not recorded.

5.) In step 2.4.3, the word "exactly" is removed. The engraved value of the drum circumference and the displayed value of the drum circumference are in different formats. There is a concern that specifying an "exact" match might halt the procedure. This has not been a problem in the past, however.

6.) The action steps in the Caution Statement prior to step 2.8.10 have been placed in sub-steps of step 2.8.10. Editorial comment/change.

7.) The displacer area value (DA) is entered in step 2.9.15 and recorded on the data sheet. This parameter was not previously addressed in the procedure, but the different displacers used (level, density, leak-detection) do have different cross-sectional areas.

8.) The acceptable range of water density is expanded from 993-1003 kg/m^3 to 988-1008 kg/m^3 in the note prior to step 2.10.1. Various ENRAF documents specify different accuracy values for density measurement. Revision 9 used the most stringent value specified (+/- 3 kg/m^3), while Revision 10 will use the accuracy specified for the "Interval Profile" density test that is actually performed (+/- 10 kg/m^3).

9.) The density profile test range is changed from 6-9 inches below the surface to 8-11 inches below the surface in steps 2.10.7 and 2.10.8. Starting at 6 inches left part of the displacer above the water surface level, contributing to error in the density measurement.

10.) Step 2.2.3 is added to the data sheet. This records the value of the Level Dimension (LD).

11.) Step 2.9.15 is added to the data sheet. This records the displacer's cross-sectional area (DA).

12.) The attribute on the data sheet for step 2.9.17 is changed from "WV" to "WW". This was a typographical error in Revision 9.

13.) The density profile start and stop values are changed on the data sheet for steps 2.10.7 and 2.10.8. (See item 9 above.)

14.) The expected value for the SC command is changed in step 2.10.11 on the data sheet. (See item 8 above.)

15.) Revision 10 is completely reformatted to bring it in compliance with the editorial standards of TFC-BSM-AD-STD-02, Rev. B. Most noticeable is a change in the font used. The order of test sections and steps remain the same.

Note: An AutoCAD page may be used in place of this form (the header section items must be included on the AutoCAD page).

ENRAF Series 854 Advanced Technology Gauge (ATG) Acceptance Test Procedure

William E. Willingham Jr., COGEMA Engineering Corporation,
for CH2MHILL Hanford Group, Inc.
Richland, WA 99352
U.S. Department of Energy Contract DE-AC27-99RL14047

EDT/ECN: 723181-R0 UC: N/A
Cost Center: 7T400 Charge Code: 500825
B&R Code: N/A Total Pages: 42

Key Words: ENRAF, Densitometer, Gauge, Gage, ATG, Level, LIT, DIT, Level Indicating Transmitter, Density Indicating Trnasmitter, Logger, LOGv18

Abstract:
This Aceptance Test Procedure determines acceptability of ENRAF Series 854 ATG Level Gauges and Densitometers before they are installed in the field.

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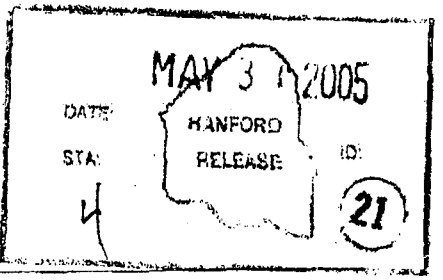

Casey Conservier 5-31-05
Release Approval Date

Release Stamp

Approved For Public Release

RECORD OF REVISION	(1) Document Number HNF-SD-WM-ATP-077	Page 1

(2) Title

ENRAF SERIES 854 ADVANCED TECHNOLOGY GAUGE (ATG) ACCEPTANCE TEST PROCEDURE.

Change Control Record

(3) Revision	(4) Description of Changes – Replace, Add, and Delete Pages	Authorized for Release		
		(5) Cog. Engr.	(6) Cog. Mgr.	Date
0	(7) EDT-141624, 2/18/94	GA Barnes	TL Moore	
0-A	Add Record of Revision page i, replaces pages 2 of 14 and 14 of 14. ECN-602579, 4/15/94.	GA Barnes	TL Moore	
0-B	Replaces Record of Revision page i, replaces pages 10 of 14 and 14 of 14. ECN-602580, 5/3/94.	GA Barnes	TL Moore	
0-C	Replace ROR page i, replaces pages 4, 6, 9, 12 and 14, add Appendix A. ECN-608122, 5/24/94.	GA Barnes	TL Moore	
1	Replace Rev. 0-C with Rev. 1, ECN-608122, ECN-613180, 7/20/94	GA Barnes	TL Moore	
2	Replaces Rev. 1 with Rev. 2. Rev. 2 is a complete rewrite. ECN-613319, 1/24/95	GA Barnes	TL Moore	
3	Replaces Rev. 2 with Rev. 3. Rev. 3 is a complete rewrite. ECN-620620, 5/5/95	GA Barnes	TL Moore	
4	Replaces Rev. 3 with Rev. 4. Rev. 4 is a complete rewrite. ECN-631224, 3/27/96	GA Barnes	TL Moore	
5	Replaces Rev. 4 with Rev. 5. Rev. 5 incorporates test requirements for Enraf densitometers. ECN-631297	JH Huber	JL Homan	
6	Clarified recording of DV in step 2.8.31. Added additional steps in section 2.7. ECN-638783, ECN-617152, ECN-613204	JH Huber	JL Homan	
7	Revised Densitometer Acceptance and updated format. ECN-638790	JH Huber	RE Larson	
8	Revised force transducer calibration check and eliminated densitometer calibration. ECN-654657.	JH Huber 8/16/99	RE Larson 8/16/99	
9	Adds tests requirements for Enraf Densitometers. Complete rewrite. Reorganizes test sections. ECN-721489-R0.	MA Roberts 3/4/03	RN Dale 3/4/04	
10 RS	Changes acceptance criteria and makes a few minor corrections and additions. Total reformat of procedure. ECN-723181-R0	BK Everett 5/24/05	BL Thacker 5-31-05	

ENRAF SERIES 854 ADVANCED TECHNOLOGY GAUGE (ATG) ACCEPTANCE TEST PROCEDURE

W. E. Willingham Jr.
COGEMA Engineering Corporation for CH2MHILL

May 24, 2005

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WORK RELEASE CHECKLIST FOR OL 3

(For Operations Pre-Release Review)

Work Package No.: tfc-10-1389 Reviewed By: k. smith Date: 4/29/10

Title: shop cal ap enraf's

Document Check:

N/A	YES	
○	●	Work Instructions
○	●	Data Sheets
●	○	BOM
○	●	CACN listed
●	○	Hold Points
●	○	Waste Planning Checklist
○	●	WHA / JSA
○	●	Pre-Job Safety Meeting form
○	●	Attendance Roster
●	○	RWP
●	○	ALARA Management Worksheet
●	○	OTP (Operational Test Procedure)
●	○	ATP (Acceptance Test Procedure)
●	○	USQ Eval. # ( )
○	●	ECNs (# 723181) (#) (#)
●	○	Reference Drawings
●	○	Lockout / Tagout Authorization or AWT form prepared
●	○	Asbestos Work Permit / Negative Exposure Assessment
●	○	Hot Work Permit (fire watch required)
●	○	Confined Space Entry Permit
●	○	Non-Permit Confined Space monitoring form
●	○	Excavation Permit
●	○	Ground Scan
●	○	EEWP
●	○	Procedures
●	○	Vehicle Route Map
●	○	Critical Lift Procedure
●	○	Hoisting and Rigging Information
●	○	MSDS Sheets
●	○	Glove Bag / Containment Form
●	○	Ignition Source Control Requirements Screening
●	○	Standing Orders
●	○	Fall Protection

3.0 Limiting Condition for Operation (LCO) Applicablity:

N/A	YES		
●	○	3.3	SST Steady-state Flammable Gas Control for 241-B-203 and 241-B-204
●	○	3.4	DST Induced Gas Releas Event Flammable Gas Control
●	○	3.6	DCRT Steady-state Flammable Gas Control

5.0 Administrative Controls (AC):

N/A	YES		
●	○	5.8.2	Flammable Gas Control for Waste-intruding Equipment
●	○	5.8.3	Flammable Gas Controls for Inactive/ Mixcellaneous Tanks/facilities
●	○	5.8.5	Waste Transfer System Overpressure Protection
●	○	5.8.6	Double Valve Isolation
●	○	5.8.7	Service Water Pressure Detection and Waste Transfer Pump Shutdown
●	○	5.8.8	Backflow preventer AN01A-WT-BFP-101 Radiation Monitoring and Isolation

5.9 Administrative Control Key Elements:

N/A	YES		
●	○	5.9.2	Ignition Controls
●	○	5.9.3	Waste Transfer-associated Structure Cover Installation and Door Closure

6.0 Design Features:

N/A	YES		
●	○	6.1	Waste Transfer Primary Piping Systems
●	○	6.2	Hose-in-Hose Transfer Line (HIHTL) Systems
●	○	6.3	Isolation Valves for Double Valve Isolation
●	○	6.4	Backflow Preventers
●	○	6.5	Waste Tranfer Pump AN01A-WT-P-022 Nitrogen Supply system Check Valves
●	○	6.6	Waste Transfer System Pressure Relieving Devices
●	○	6.7	Compressed Air System Pressure Relieving Devices

Comments:

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WORK RELEASE CHECKLIST FOR OE'S (continued)

(For Operations Pre-Release Review)

Work Package No.: tfc-10-1389 Reviewed By: k. smith Date: 4/29/10

Title: shop cal ap enraf's

DID Controls

N/A	YES	
◉	○	Flushing of Waste Transfer Lines
◉	○	DST Primary Tank Ventilation Systems
◉	○	Material Balance Monitoring
◉	○	Design/Procedures For Draining Transfer Systems
◉	○	Fire Protection Requirements
◉	○	Flammable Gas Concentration Requirements for Waste Sample Containers
◉	○	Transfer Leak Detection/Alarm Response
◉	○	Vehicle Barriers or Vehicle Restrictions
◉	○	Spotters
◉	○	Excavation Program
◉	○	Pre-Transfer Verification of Valve Lineup
◉	○	241-AN-01A Pump Pit Heater Thermostat
◉	○	Winterization/Freeze Protection
◉	○	Transfer System Thermal Expansion Protection
◉	○	Design of Waste Transfer Pump Shaft Sealing Systems
◉	○	Pre-Transfer Walkdown
◉	○	Waste Transfer Line Encasements for Unburied or Exposed Transfer Lines

242-A Administrative Controls (ACs):

N/A	YES		
◉	○	5.6.1.1	Restriction on 242-A Pump Room and Evaporator Room Access
◉	○	5.6.1.2	Sample Cubicle Leak Detection
◉	○	5.6.1.4	Fire Protection
◉	○	5.6.1.11	242-A Evaporator Instrumentation

Comments:

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WORK RELEASE CHECKLIST FOR OE'S (continued)

(For Operations Pre-Release Review)

Work Package No.: tfc-10-1389 Reviewed By: k. smith Date: 4/29/10

Title: shop cal ap enraf's

		YES	N/A
1.	Is configuration of equipment and systems properly identified for safe operation while the work is being performed?	◉	○
2.	Is operability of the equipment and systems properly restored as part of the retesting? (SS/SC must address retest.)	○	◉
3.	Are the Lock and Tag steps required to install and remove included in the work document and are the forms complete and in the WP?	○	◉
4.	Are TSR, LCO, OSD, and AB requirements properly included? (Note for LCO entry/exit.)	○	◉
5.	Are work scope boundaries clear and the forms complete and in the WP?	◉	○
6.	Has the work scope been evaluated to prevent start-up of interconnected equipment even if the equipment presents no hazards to the workers?	◉	○
6.a.	Are caution tags or Administrative locks required to prevent start-up of interconnected equipment?	○	◉
7.	Partial Release Required?	○	◉

Comments:

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OPERATIONS WORK PACKAGE (WP) ACCEPTANCE CHECKLIST

WP Number: TFC-WO-10-1389 Date: 6/10/10

Name of Reviewer: NL Forsman

	WP Review for Operations Acceptance (Do not Ops Accept if any "NO" checked - Return to Work Control to resolve)	YES	NO	N/A
1.	Has the Field Work Supervisor signed the work package field work complete?	◉	○	○
	• Did the workers/FWS adequately document the work performed?	◉	○	○
	• Has the FWS written work requests for all failed or deficient SSC?	○	○	◉
	• Are the documented data, checklists and permits completed as required for the activity to allow it to be returned to Operations (Hold Points, supporting procedures, data sheets, signoffs, etc.)? o (Note Post Review signoffs are not required for Operations acceptance)	◉	○	○
2.	If the work package involves an ECN, has engineering closed out the ECN (Modification Complete Block signed)?	◉	○	○
	• If the work package involves a Temporary Modification ("TM" block is checked on the front page of the ECN), has engineering signed the "Restored To Original Status" block of the ECN? o Has the Temporary Modification been removed from the Temporary Modification Logbook? o Has the Caution Tag been removed from the Temporary Modification?	○	○	◉
3.	Has the Controlling Organization Lockout "work complete" block on the Tag Out Authorization Form been signed for the work package? • If a single point lockout/tag out or Authorized Worker Lockout was used, is the form filled out completely (i.e., work complete and lock removed)?	○	○	◉
4.	If a routing board update was required, was the routing board updated? • Were jumper leak check requirements implemented?	○	○	◉
5.	Is the current status of the SSC known and acceptable for turnover to Operations (i.e., operable, returned to service, out of service)?	◉	○	○

Comments:

N/A

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Attachment 2-3

WRPS Tank Farm NEC Compliance Permit Report

Permit Number: (YR - REL - PAIT) 2010 - W2B - 251	Permit Issue Date: 11/17/10
Report Number:	PER Numbers: Permit Expiration Date:
Requestor's Name: MIKE HAY	Requestor's Phone No.:
ECN Nos.:	Contract No. ~~30281~~ 36572 Release No.: 22
Drawing Nos.: TFC-WO-10-1379	
Scope of Work:	
Point of Contact:	POC's Phone No.:
PIC's Name	PIC's Phone No.:
Engineer's Name	Engineer's Phone No.:
Project: ☐ Retrieval ☐ Waste Feed Operations ☐ Maintenance ☒ Other:	
NEC Inspector's Name: BILL BRESINA	NEC Inspector's No.: NEC Code Edition: 2008
Type of NEC Inspection: ELECTRICAL INSTALLATION OF POWER FOR TMACS, CTN COMMUNICATIONS, FOR ELRAFS	
Items Inspected:	
Inspection Status: ☒ Approved ☐ Not Approved	
Re-Inspection Required: ☐ Yes ☒ No	Permit Status: ☐ Open ☒ Closed
NEC Inspectors Signature: Bill Bresina	Date: 11/17/10

	Code Violation (Indicate Applicable Code Section) 15 Working Days to Make Corrections and Call for Re-Inspections	Approved Initial & Date
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

COMMENTS LISTED BELOW

ENRAF Series 854 Initial Installation and Operational Check

Tank Farm Maintenance Procedure **MAINTENANCE**

USQ #GCX-2

Justification:
Format change as requested by records management.

Summary of Changes:
Updated records section to reflect new format.

Next Periodic Review Date - 04/08/2013

Click for copy of Word (native) file

Table of Contents

1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides post installation calibration/initial settings of the ENRAF Model 854 Displacer Type Level Gauge and instructions for initial installation of the drum and displacer.

1.2 Scope

This procedure applies to post installation calibration/initial settings of the ENRAF Model 854 level gauges and initial installation of the drum and displacer. The test will verify that the gauge has been set up and calibrated according to the manufacturer's instructions.

2.0 INFORMATION

2.1 Terms and Definitions

PET - Portable ENRAF Terminal.

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

3.1.1 If an energized work permit is required during the performance of this procedure, comply with TFC-ESHQ-S-STD-03 Electrical Safety.

3.1.2 If a lock and tag is required during the performance of this procedure, comply with DOE-0336, Hanford Site Lockout/Tagout Procedure.

WARNING - An open isolation valve indicates the ENRAF internals are exposed to the tank environment which could result in Radiological hazards.

3.2 Equipment Safety

CAUTION - Slight bends in the wire are acceptable but a kink could cause the wire to break.

CAUTION - Never tighten the compartment cover before the threads are properly engaged. Keep threads free from dirt, failure to do so could damage the threads.

CAUTION - When closing, the covers should be turned counterclockwise until the threads click into place, failure to do so could damage the cover.

CAUTION - Make sure displacer is still resting on the ball valve before issuing command AR or calibration errors will occur.

3.3 Radiation and Contamination Control

Work in radiological areas will be performed using a radiation work permit following review by Radiological Control per the ALARA Work Planning Procedure TFC-ESHQ-RP_RWP-C-03.

3.4 Environmental Compliance

3.4.1 If leak detection equipment failure occurs, a maintenance outage, or in the event that leak detection equipment preventive maintenance or functional testing that will exceed 24 hours downtime, Notify Environmental per Environmental on-call list in accordance with TFC-ESHQ-ENV_FS-C-01.

3.4.2 If waste is generated during the performance of this procedure, dispose of it in accordance with TO-100-052, Perform Waste Generation, Segregation, Accumulation and Clean-up.

3.4.3 Tank farm ventilation systems and exhaust monitoring systems are regulated under Washington State Administrative Code (WAC) chapters 173 400, 173 401, and 246 247 and sections of Air Operating Permit (AOP) and Radioactive Air Emission License (FF01). Ensure primary tank HEPA ventilation is operating during the performance of this procedure.

3.4.4 To ensure reporting requirements are met, all unplanned outages of tank farm ventilation, including portable exhausters, and both planned and unplanned outage of exhaust record samplers, must be immediately reported to Environmental On-Call per the On-Call List, in compliance with TFC-ESHQ-ENV_FS-C-01.

3.4.5 In accordance with TFC-ESHQ-ENV_RM-C-04, Ensuring Water Quality, routine maintenance and operation activities may result in small incidental discharge of raw water as long as the below listed limits and conditions are met. Refer to TFC-ESHQ-ENV_RM-C-04, Table 1, for the listing of approved incidental discharges.

- No discharge from a single activity may exceed 60 gallons released to the soil.
- Appropriate best management practices shall be implemented to prevent unnecessary discharges.
- During pre-job planning, measures to limit soil erosion will be incorporated in the work plan.
- During performance of the work, all measures to limit ponding and/or erosion will be implemented.
- There is no allowable discharge volume for discharges resulting from operating error.

3.4 Environmental Compliance (Cont.)

3.4.6 If air grab samples are required, notify Environmental per the Environmental On-Call List in accordance with procedure TFC-ESHQ-ENV-FS-C-01 if any of the below items are met:

- Initial field count of air samples with beta-gamma activity greater than 0.2 Derived Air Concentration (DAC)
- Initial field count of air samples with total alpha activity greater than 5.0 DAC
- Results of 7-day decay count of air samples with total alpha activity greater than 0.2 DAC.

NOTE - Elevated workspace air samples that are suspected to be radon or its daughter products are to be reported to the Environmental on-call list within 24 hours of field count if radon is NOT confirmed. If the sample decay rate is indicative of radon, whether or not the sample remains above 5 DAC alpha within the 24 hour verification period, notification to the Environmental on-call list is NOT required. If the decay rate is not indicative of radon, the Environmental on-call list must be notified. Upon notification of the elevated workspace air sample, the Environmental on-call list must notify WDOH within 24 hours.

4.0 PREREQUISITES

4.1 Special Tools, Equipment, and Supplies

The following supplies may be needed to perform this procedure:

- Calibration unit - Portable ENRAF Terminal Model No. 847
- Replacement gaskets for sight glass window assembly (if required)
- 5/16" Allen wrench
- 3 mm Allen tee-handle wrench
- Small screwdriver
- Shop stock wire from ENRAF (≅ 12" length)
- Tape
- Other tools, equipment, and supplies as identified by Shift Manager/OE/ FWS/User.

4.2 Performance Documents

The following procedures may be needed to perform this procedure:

- TO-040-180, Operate Tank Surface Level Monitoring Devices
- DOE-0336, Hanford Site Lockout/Tagout Procedure.

4.3 Field Preparation

4.3.1 **IF** the gauge is connected to TMACS, **ENSURE** the system operators has been notified (i.e., 373-2618) of intent to perform this procedure.

NOTE - For ENRAF gauges used for annulus leak detection, this value will start at 850 inches. This value will change upon completion of calibration of displacer on bottom of annulus.

4.3.2 FWS **OBTAIN** correct RL (reference level) value from Engineering Change Notice (ECN) **AND**

RECORD on page 18, Calibration Data Sheet, item "I".

4.3.3 **CONFIRM** that the portable ENRAF terminal powers up.

4.3.4 **ENSURE** release from Shift Manager has been **OBTAINED**, prior to beginning performance of this procedure.

4.3.5 **ENSURE** applicable lock and tag, authorized worker tag or Energized Work Permit requirements have been satisfied per DOE-0336, Hanford Site Lockout/Tagout Procedure.

5.0 PROCEDURE

NOTE - This procedure contains a Calibration Data Sheet which may be copied if this procedure is to be performed multiple times.

- If performance of any steps in this procedure is not required for procedure completion, steps not performed must be indicated as such by entering "N/A" in appropriate data sheet signoff space and explained in COMMENTS/REMARKS section of Data Sheet, if applicable.

5.1 Initial Installation of Drum and Displacer

WARNING

An open isolation valve indicates the ENRAF internals are exposed to the tank environment which could result in Radiological hazards.

5.1.1 **ENSURE** by visual inspection that the isolation valve is **SECURED** in the closed position.

5.1.2 **IF** isolation valve is NOT in the closed position, **STOP WORK AND NOTIFY** FWS.

5.1.3 **ENSURE** by visual inspection that the power switch is in the "OFF" position, or receptacle plug is "disconnected".

5.1.4 **REMOVE** the electronic compartment cover.

5.1.5 **ENSURE** by visual inspection that the "motor lock," located at the bottom left corner of the electronic compartment, is in the locked position (Figure 1 - Motor Lock).

5.1.6 **CONFIRM** by visual inspection that approximately the first 4 feet of wire on the drum to be installed are free of kinks, **AND**

RECORD on Calibration Data Sheet (item A).

5.1 Initial Installation of Drum and Displacer (Cont.)

5.1.7 **RECORD** drum circumference value engraved on wire drum on the Calibration Data Sheet (item C).

5.1.8 **RECORD** the displacer weight shown/tagged on the displacer as the New Displacer Weight on the Calibration Data Sheet (item D).

CAUTION

Slight bends in the wire are acceptable but a kink could cause the wire to break.

5.1.9 **IF** during installation of the drum or displacer, the wire becomes kinked, **CONTACT** Engineering for direction.

5.1.10 **REMOVE** the drum compartment cover from the gauge.

5.1.11 **REMOVE** the sight glass cover.

5.1.12 **REMOVE** rubber band or tape from drum.

5.1.13 **WHILE INSERTING** the drum into its bearings, **FEED** wire and mounting snap from reel housing to sight glass opening **WHILE MAINTAINING** tension on reel.

5.1.14 **IF** displacer has factory hook, **PULL** wire through sight glass window, **AND**

CONNECT displacer to the wire.

5.1.14.1 **USING** a piece of wire (≅ 12" length), **WRAP** one end around the measuring wire as shown in Figure 4.

5.1.14.2 **PASS** other end of wire through hole in tip of displacer hook. **AND**

WRAP wire several times around hook and through hole to secure the displacer (see Figure 4).

5.1 Initial Installation of Drum and Displacer (Cont.)

5.1.15 **IF** displacer has eye-hook, **PULL** the mounting snap through the sight glass window.

5.1.15.1 **CONNECT** displacer to the snap, **AND**

VISUALLY ENSURE displacer connection.

5.1.16 **PLACE** the displacer through the sight glass by placing the bottom end in first while holding the wire with other hand or other mechanical means (i.e., tongs or wire hook).

5.1.17 **CONTINUE** lowering the displacer into the sight glass until it is suspended from the gauge.

5.1.18 **CHECK** the axial free-play by performing the following substeps:

5.1.18.1 **PUSH** the drum toward the magnet cap in such a way that the drum shaft meets the magnet cap.

5.1.18.2 **SLIGHTLY MOVE** the drum in and out, **WHILE CHECKING** that the drum and drum shaft are free to move towards you.

5.1.18.3 **ENSURE** the drum is in contact with the magnetic cap.

CAUTION

Never tighten compartment cover before threads are properly engaged. Keep threads free from dirt, failure to do so could damage the threads.

When closing, the covers should be turned counterclockwise until the threads click into place, failure to do so could damage the cover.

5.1.19 **UNLOCK** the "motor lock" located at the bottom left corner of the electronic compartment (Figure 2 - Motor Unlock).

5.1.20 **REPLACE** all covers (sight glass, electronic compartment, and drum compartment).

5.2 Drum Circumference Check

5.2.1 **IF** not already connected, **CONNECT** portable ENRAF terminal to gauge to be tested by plugging the terminal's optical coupler into the socket located on the left side of the gauge when facing the display, **AND**

PRESS the ON/RESET button.

NOTE - In the event the gauge is not yet connected to permanent power, the word "SWITCH power ON/OFF to gauge" shall be taken to mean "Plug in gauge."

5.2.2 **IF** power is OFF, **SWITCH** power ON to gauge.

5.2.3 **ENTER** Command [DC]. (This command displays the programmed drum circumference).

NOTE - The portable ENRAF terminal displays the drum circumference in scientific notation, which is different from the format engraved on the drum. The value displayed by the portable ENRAF terminal will look like: "DC=+.33000000E+00". The units here are meters, whereas the drum value is given in millimeters. The same value on the drum would look like: "330.0000".

5.2.4 **CHECK** that programmed drum circumference value matches value for drum circumference found engraved on wire drum (item C), **AND**

IF value does match, **RECORD** [DC] programmed drum circumference (As-Left Programmed Value) on Data Sheet (item B), **AND**

GO TO Section 5.3.

5.2.4.1 **ENTER** Command [W2=ENRAF2]. (This command enters protection level 2).

5.2.4.2 **ENTER** Command [DC=+.xxxxxxxxE+00], where xxxxxxxx is the value engraved on the wire drum. (i.e., DC= +.32703900E+00).

5.2.4.3 **RECORD** [DC] as the programmed drum circumference (As-Left Programmed Value) on the Calibration Data Sheet (item B).

5.2.4.4 **ENTER** Command [EX]. (This commands exits protection level 2).

5.3 Displacer Weight Check

NOTE - The displacer must be at least 8 inches below the upper adaptor flange before performing this section.

5.3.1 **ENTER** Command = [UN]. (This command returns the gauge to the operational mode. The displacer will rest on the closed ball valve).

5.3.2 **WAIT** until gauge stabilizes.

5.3.3 **ENTER** Command = [CA]. (This command raises the displacer).

5.3.4 **WAIT** a few seconds to allow displacer to rise a couple of inches.

5.3.5 **ENTER** Command = [FR]. (This command freezes the motion of the displacer).

5.3.6 **ENTER** Command = [MF]. (This command measures the frequency of the transducer).

5.3.7 **WAIT** for "FR" to appear in the display.

5.3.8 **ENTER** Command = [WQ]. (This command displays the as-found displacer weight).

5.3.9 **RECORD** the as-found displacer weight on Calibration Data Sheet (item E).

NOTE - A WQ value that is within tolerance will verify that the force transducer is still within calibration.

5.3.10 **CONFIRM** that the difference between the weight recorded in Step 5.1.8 (item D) and the [WQ] weight (item E) is within ± 6 grams.

5.3.11 **IF** difference verified in Step 5.3.10 is within tolerance **RECORD** on Calibration Data Sheet (item F),

OR

IF difference verified in Step 5.3.10 is NOT within tolerance **RECORD** on Calibration Data Sheet (item F), **AND**

CONTACT Engineering.

5.3 Displacer Weight Check (Cont.)

5.3.12 **ENTER** Command = [DW], **AND**

RECORD on Calibration Data Sheet (item G). (This command displays the programmed displacer weight).

5.3.13 **IF** [WQ] does not match [DW] to within ± 6 grams **CONTACT** Engineering, **AND**

PROCEED as directed.

5.3.14 **IF** [WQ] matches [DW] to within ± 6 grams, **PERFORM** the following steps:

5.3.14.1 **ENTER** Command [W2=ENRAF2]. (This command enters protection level 2).

5.3.14.2 **ENTER** Command [DW=+.xxxxxxxxE+03] where .xxxxxxxx is the [WQ] value recorded above.

5.3.15 **IF** no value is specified on the Calibration Data Sheet, **SUBTRACT** 15 grams from the as-found value of [WQ], **AND**

RECORD this value as [S1], [S3] and [RM] on Calibration Data Sheet (item H).

OR

IF a value other than 15 grams is specified on the Calibration Data Sheet, **SUBTRACT** the specified value from the as-found value of [WQ], **AND**

RECORD this value as [S1], [S3] and [RM] on Data Sheet (item H).

5.3.16 **ENTER** Command [S1=+.xxxxxxxxE+03], where .xxxxxxxx is the [S1] value recorded above.

5.3.17 **REPEAT** Steps 5.3.15 through 5.3.16 for [S3] and [RM].

5.3.18 **ENTER** Command [S2=+.05000000E+03].

5.3.19 **ENTER** Command = [EX]. (This command exits protection level 2).

5.4 Calibration Check

5.4.1 **ENTER** Command = [UN]. (This command will return the gauge to operational mode. The displacer will rest on the closed ball valve).

5.4.2 **WAIT** for level reading to stabilize.

5.4.3 **ENSURE** RL value obtained in Step 4.3.2 has been entered as the correct RL value on the Calibration Data Sheet (item I).

5.4.4 **PERFORM** reference level entry as required.

5.4.4.1 **ENTER** Command = [W2=ENRAF2]. (This command enters protection level 2).

5.4.4.2 **ENTER** Command = [RL=+XXXXX.XX], where XXXXX.XX is the correct RL value, **AND**

RECORD as programmed RL value on the Calibration Data Sheet (item J).

CAUTION

Make sure displacer is still resting on the ball valve before issuing command AR or calibration errors will occur.

5.4.4.3 **ENTER** Command = [AR]. (This command authorizes the gauges to accept the corrected value for "RL").

5.4.4.4 **ENTER** Command = [EX]. (This command exits protection level 2).

5.4.4.5 **WAIT** until the level reading stops changing, **AND**

RECORD as the As Left RL Reading (item K).

5.4.4.6 **IF** reference level cannot be achieved to ± 0.10 inch for level gauge **CONTACT** Engineering, **AND**

PROCEED as directed.

5.4 Calibration Check (Cont.)

5.4.5 **ENTER** Command = [CA]. (This command raises the displacer to the ENRAF adapter flange).

5.4.6 **CHECK** by visual inspection that the displacer can be seen through the sight glass.

5.4.7 **WHEN** the displacer reaches the ENRAF adapter flange and stops, **PERFORM** the following:

5.4.7.1 **RECORD** the level reading displayed on the gauge as the as-found TT on Calibration Data Sheet (item L).

5.4.7.2 **ENTER** Command = [W2=ENRAF2]. (This command enters protection level 2).

5.4.7.3 **ENTER** Command = [TT=+XXXXX.XX], where +XXXXX.XX is the level reading when the displacer is at the ENRAF adapter flange, **AND**

RECORD as programmed TT on the Calibration Data Sheet (item M).

5.4.7.4 **RECORD** the level displayed on the gauge as the as-left TT on the Calibration Data Sheet (item N).

5.4.7.5 **ENTER** Command [EX]. (This commands exits protection level 2).

5.4.7.6 **ENTER** command [UN] to lower the displacer 6 to 10 inches before proceeding to the next step.

5.4.8 **ENTER** Command = [FR]. (This command freezes the motion of the displacer).

5.4.9 **OPEN** the isolation valve, **AND SECURE** it.

5.4.10 **ENTER** Command = [UN]. (This command returns the gauge to the operational mode).

5.4 Calibration Check (Cont.)

5.4.11 **IF** the displacer gets caught up either on the PVC flange or on an undersized neoprene gasket, **PERFORM** the following sub-steps.

5.4.11.1 **ENTER** W2 protection mode.

5.4.11.2 **CHANGE** setpoint (S2) to 50 grams (if not already 50 grams) USING standard command entry format.

5.4.11.3 **EXIT** W2 protection mode.

5.4.11.4 **ENTER** command [I2].

5.4.11.5 **USE** the [CA] and [UN] commands to get passed the obstruction.

5.4.11.6 **WHEN** the displacer is passed the obstruction, **ENTER** command [I1] to return to normal operation.

5.4.12 **WAIT** until the level reading stops changing.

5.4.13 **IF** the ENRAF will be used for tank level, **GO TO** Step 5.4.15.

5.4.14 **IF** the ENRAF will be used on an Annulus, **PERFORM** the following:

5.4.14.1 **ENTER** Command = [W2=ENRAF2].

5.4.14.2 **ENTER** Command = [RL=+00000.15].

5.4.14.3 **ENTER** Command = [AR].

5.4.14.4 **ENTER** Command = [EX].

5.4.14.5 **WAIT** until the level reading stops changing.

5.4.14.6 **IF** level is within ±0.04, **RECORD** the as-left tank annulus bottom reading on Calibration Data Sheet (item O), **AND**

GO TO Section 5.5.

5.4.14.7 **IF** level is NOT within ±0.04, **CONTACT** FWS and Engineer, **AND**

PROCEED as directed.

5.4 Calibration Check (Cont.)

5.4.15 **RECORD** the as-left tank liquid level reading on Calibration Data Sheet (item O).

5.4.16 **ENTER** command = [MH]. (This is the Motor High limit setting. The travel speed of the displacer is slower when above this setting).

5.4.17 **CHECK** that the Motor High setting is equivalent to the Correct RL value plus 15 inches, ± 1 inch.

5.4.18 **IF** the Motor High setting is NOT correct perform the following substeps, **OTHERWISE, GO TO** Section 5.5.

5.4.18.1 **ENTER** command = [W2=ENRAF2].

5.4.18.2 **ENTER** command = [MH=+xxxxx.xx], where xxxxx.xx equals the Correct RL value plus 15 inches.

5.4.18.3 **ENTER** command = [EX].

5.5 Restoration

5.5.1 **ENSURE** all test equipment has been disconnected and removed.

5.5.2 **ENSURE** measuring and test equipment (M&TE) and calibration status are recorded on Data Sheet.

5.5.3 **ENSURE** instrument enclosure cover is properly reinstalled.

5.5.4 **ENSURE** equipment system restoration by observing indications are consistent with expected conditions.

5.6 Acceptance Criteria

Comparison and verification that data in applicable steps of procedure are within limits (tolerance) of Data Sheet(s) satisfies Acceptance Criteria for this procedure.

5.7 Review

5.7.1 **INFORM** Shift Manager and FWS the test is complete.

5.7.2 The FWS **REVIEW AND ENSURE** the following:

- Completed Data Sheets meet the acceptance criteria.
- Comments sections are filled out appropriately.
- Work requests needed as a result of this procedure are identified and generated.
- Work request number(s) of any work documents generated as a result of this procedure, are recorded in the Comments/Remarks section of the Data Sheet, as applicable.

5.7.3 **FORWARD** copies of all data sheets to Engineering.

5.8 Records

NOTE - The following records are generated during the performance of this procedure and are maintained in the CHAMPS work package as record material.

- Calibration Data Sheet.

The record custodian identified in the Company Level Records Inventory and Disposition Schedule (RIDS) is responsible for record retention in accordance with TFC-BSM-IRM_DC-C-02.

ENRAF Series 854 Initial Installation and Operational Check

Calibration Data Sheet

INSTRUMENT TAG NO.:_____	LOCATION:_____
DESCRIPTION: LEVEL GAUGE_____	MODEL NO.: SERIES 854 ATG
MANUFACTURER: ENRAF INC._____	WORK ORDER NO.:_____

CALIBRATION SOURCE/MODEL NO.: PORTABLE ENRAF TERMINAL /_____

SERIAL NO./DATE TESTED:_____/_____

DESCRIPTION	ITEM	DATA
No Kink Verification	(item A)	Craft Signature/Date: _____
Drum Circumference	(item B)	As-Left Programmed Value:_____
	(item C)	Engraved Value:
Displacer Weight	(item D)	New Displacer Wt. (Tagged)_____
	(item E)	As-Found Displ. Wt. (WQ): _____
	(item F)	WQ within ± 6 grams of item D: Yes____ No____
	(item G)	Prog. Displ. Wt. (DW): _____
	(item H)	S1 = S3 = RM = _____
Calibration	(item I)	Correct RL Value: _____
	(item J)	Programmed RL Value: _____
	(item K)	As Left RL Reading: _____
	(item L)	As Found TT Reading: _____
	(item M)	As Programmed TT: _____
	(item N)	As Left TT: _____
Tank Level	(item O)	As Left Tank Liquid Level: _____

REMARKS:

Craft Signature/ Date:_____

Figure 1 - Motor Lock

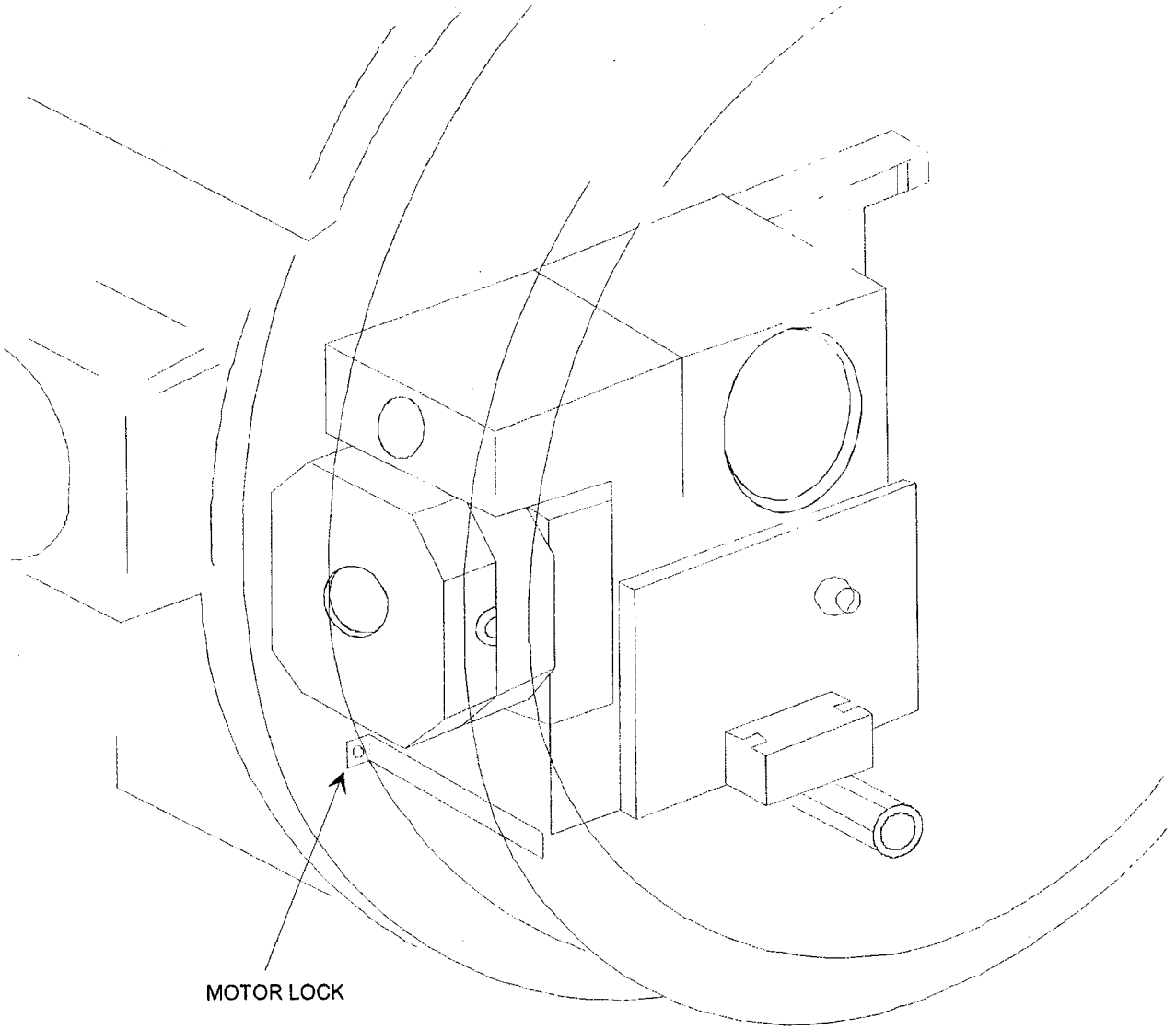


Figure 2 - Motor Unlock

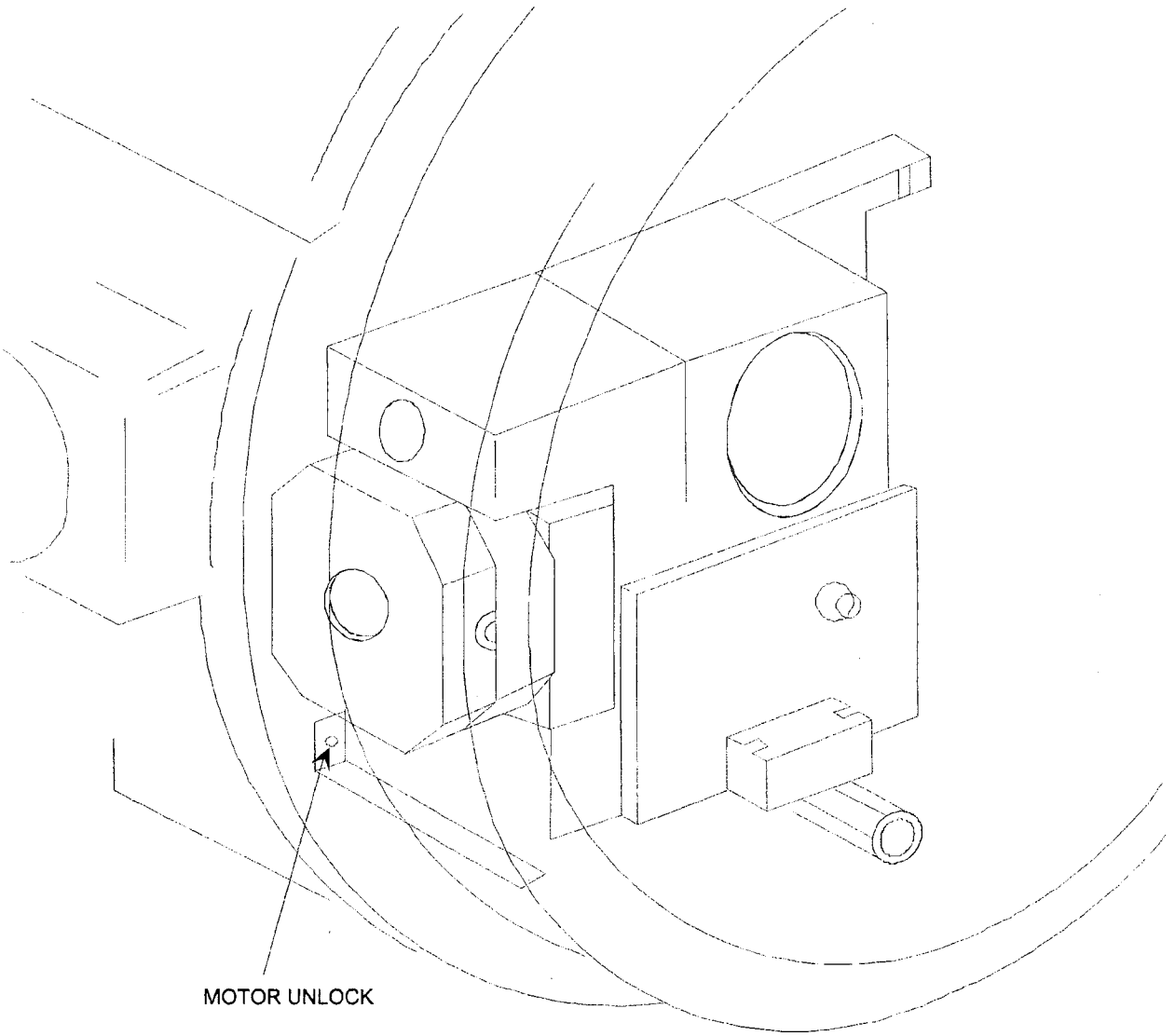


Figure 3 - Side View of ENRAF 854 Level Gauge

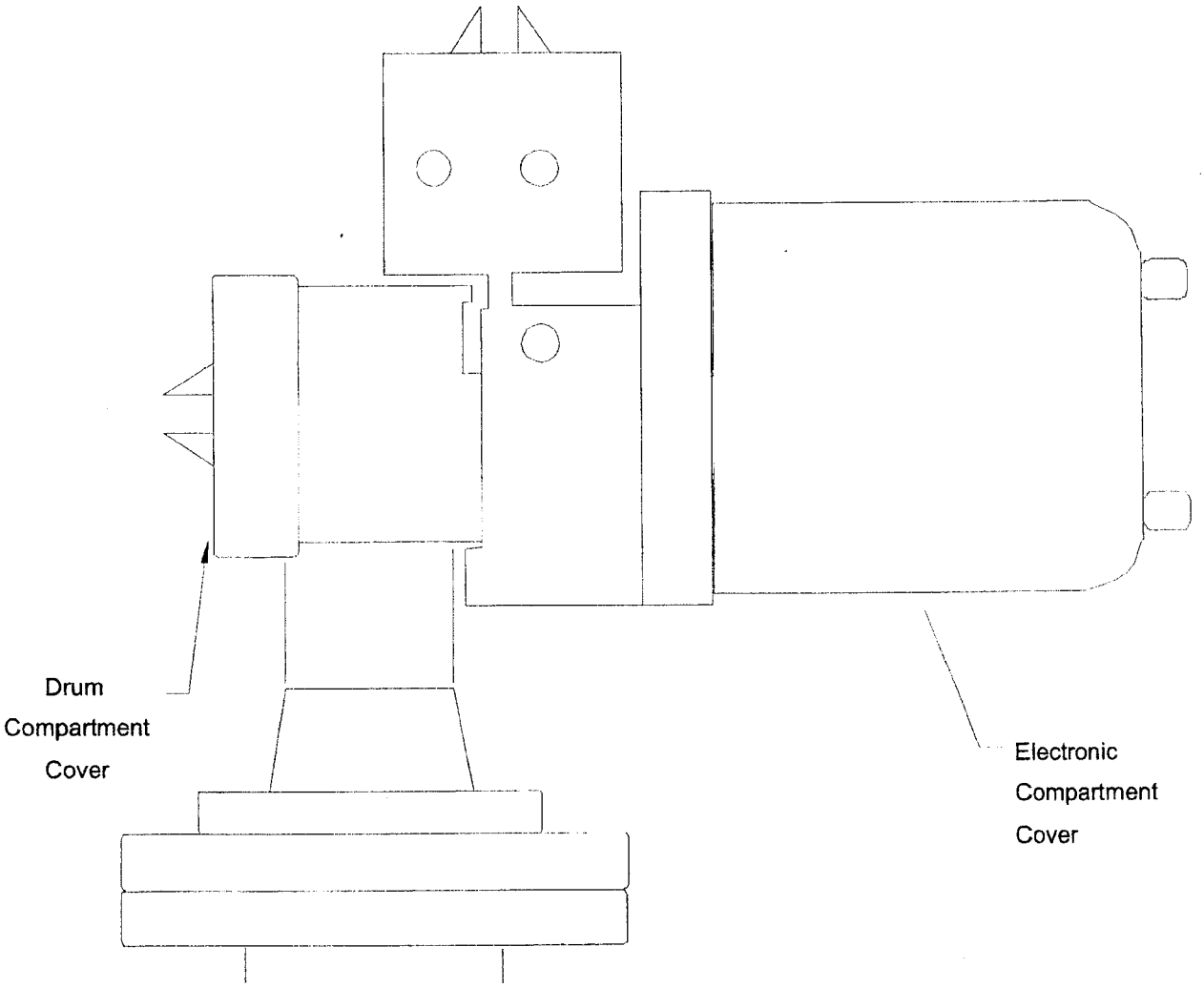
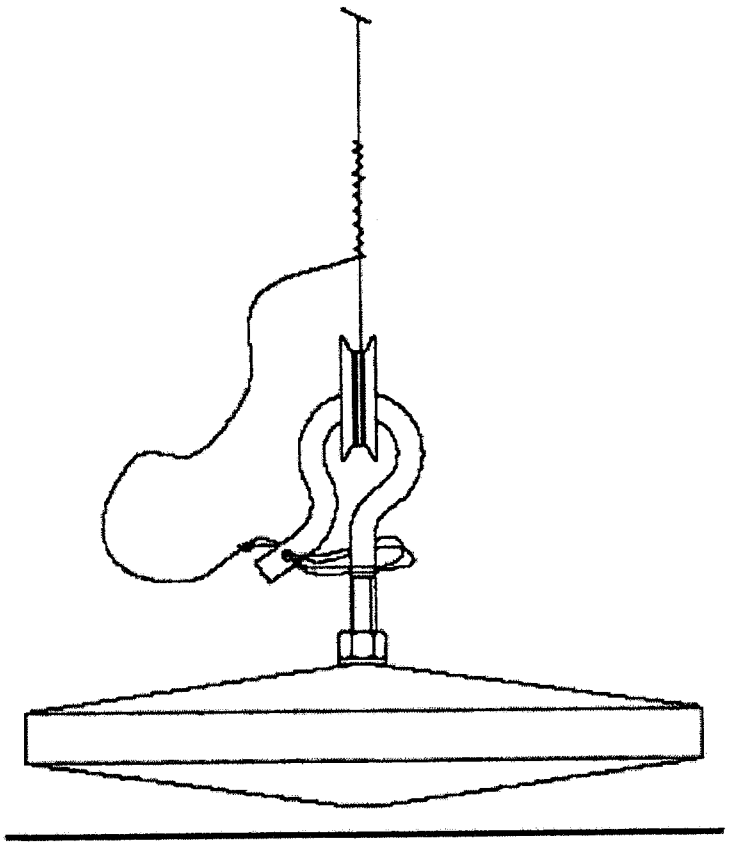


Figure 4 - Installing Security Wire



OSD-T-151-00031
Revision G-6

OPERATING SPECIFICATIONS FOR TANK FARM LEAK DETECTION AND SINGLE – SHELL TANK INTRUSION DETECTION

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Washington River Protection Solutions, LLC

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Table of Contents

TABLES

1.0 INTRODUCTION

1.1 Purpose and Scope

Operating Specifications are technical limits which are set on a process to prevent injury to personnel or damage to the facility or environment. The main purpose of this document is to provide specification limits and recovery actions for the 200 Area Leak and Intrusion Detection Surveillance Program at the Hanford Site. This document provides requirements for single-shell tanks (SSTs), double-shell tanks (DSTs), and catch tank/receiver tanks. Specification limits are given for monitoring frequencies and permissible variation of readings from an established baseline or previous reading. Most of the leak detection and intrusion detection requirements in this document are driven by environmental considerations and data analysis issues, rather than facility design or personnel safety issues.

This document is applicable to all SST and DST waste tanks, and the associated catch tanks and receiver tanks listed in Table 4-1.

The document "Single-Shell Tank System Leak Detection and Monitoring Functions and Requirements Document", RPP-9937, Rev. 3, was approved for implementation in May, 2008. The initial release of this primary TPA document in 2003 significantly altered the basic requirements for leak and intrusion monitoring in SSTs. Prior to this document the core assumption was that Leak Detection Monitoring (LDM) was legally required in all SSTs per RCRA, and would be performed wherever feasible, (within the limits of the available technology and installed equipment). This core assumption drove all revisions of this OSD prior to Rev F-0, and is described in more detail in WHC-SD-WM-TI-573 and RPP-9645. The release of RPP-9937 changed this core assumption for many of the SSTs.

RPP-9937 divides the 149 SSTs into two primary groups: those that require routine Leak Detection Monitoring (LDM) and those that do not. For the tanks that now require LDM, the original leak detection logic described in WHC-SD-WM-TI-573 and RPP-9645 is still applicable. For the remaining tanks that no longer require LDM, the TPA requirement is either a quarterly or annual reading to verify that intrusion is not occurring, (either surface level or LOW, depending on equipment available). The frequency is determined by the remaining total drainable interstitial liquid (TDIL) and whether intrusion prevention (IP) has been completed on the tank.

An expanded discussion of the current LDM and intrusion logic can be found in the latest revision of RPP-9937.

1.2 Application of Limits

Specification limits are provided for monitoring frequencies and permissible deviations of readings from an established baseline or previous reading. This document is divided into separate sections for SST leak and intrusion detection, DST leak detection, and catch/receiver tank leak and intrusion detection. Each section lists the required response and actions to be followed when a specification limit is exceeded and what constitutes a violation of this Operating Specification Document (OSD). For SSTs, the required measurement device for leak and intrusion detection is specified for each tank, where available. Pre-approved ALTERNATE measurement devices are also specified for SSTs, catch tanks, and receiver tanks, which can be used if the designated device is either out of service or upgraded.

Specification limits are given at the front of each section. The Technical Basis section provides a summary of the reasoning used to derive the specification limits, and may refer to other supporting documents. The Detection/Control section describes general practices and programs in place that can provide effective monitoring for compliance to the specification limits. Statements in this section only describe how compliance monitoring is typically performed, but they are informational only, and do not contain requirements. Finally, the Recovery Action section defines the actions to be taken if a required reading is not obtained for a variety of reasons, or an OSD violation occurs.

1.3 Frequency Definitions

For this OSD, the definition of a monitoring frequency of "daily" means at least once in the period from 00:00 hours to 23:59 hours each day. There shall be a minimum of 8 hours between successive readings.

For this OSD, the definition of a monitoring frequency of "weekly" means at least once in the period from 00:00 hours on Monday through 23:59 hours on the following Sunday. There shall be a minimum of 48 hours between successive readings.

For this OSD, the definition of a monitoring frequency of "monthly" means at least once in the period from 00:00 hours on the 1st day of each month to 23:59 hours on the last day of the same month. There shall be a minimum of 7 days between successive readings.

For this OSD, the definition of a monitoring frequency of "quarterly" means at least once in each of the periods from 00:00 hours on January 1 through 23:59 hours on March 31, 00:00 hours April 1 through 23:59 on June 30, 00:00 hours on July 1 through 23:59 on September 30, and 00:00 hours on October 1 through 23:59 hours on December 31. There shall be a minimum of 31 days between successive readings.

For this OSD, the definition of a monitoring frequency of "yearly" or "annual" means at least once in the period from 00:00 hours on January 1 to 23:59 hours on December 31 of the same calendar year. There shall be a minimum of 90 days between successive readings.

The current revision of RPP-9937, (the TPA Functions and Requirements document), does not allow for any "grace period" or "extension" if the frequency defined above is exceeded.

1.4 Definitions and Acronyms

PRIMARY Monitoring Device – A primary detection monitoring device for a single-shell tank is the instrument most capable of identifying a leak or intrusion with the highest level of confidence. PRIMARY devices, where required, are specified for each tank in this Operating Specification Document.

ALTERNATE - Alternate monitoring devices are those which may be used in place of a PRIMARY monitoring device to provide a similar or equivalent reading. An example is using a zip cord or manual tape as an ALTERNATE to an ENRAF™ reading. In most cases, an ALTERNATE device is not permanently installed on the tank and may be removed when not needed.

INTRUSION DETECTION - Intrusion detection for single-shell tanks is performed by monitoring for increases in the tank surface level or interstitial liquid level.

TREND LINE - A baseline liquid level for a tank that allows for a naturally occurring decreasing or increasing trend. The changes are normally due to evaporation or condensation, but may also be due to physical changes with the waste or temperature effects. The historical trend of the level measurements for the tank are statistically evaluated to determine a least-squares fit through the data set.

RETRIEVAL STATUS – A tank is considered to be officially in "retrieval status" if one of two conditions are met: either waste has been physically removed from the tank by retrieval operations or, preparations for retrieval operations are directly responsible for rendering the instrument "out of service" per the definition below.

SPECIFICATION LIMIT - Specification limits are limits set on leak and intrusion detection or survey methods which must be adhered to. Specification limits on data measurements are those which set an action point for when a value is considered abnormally low or high, triggering further investigation. Specification limits on data measurement frequencies are the maximum time limits permitted between successive measurements.

VERIFIED READING - A verified reading refers to a reading outside the listed specification limits for a tank, which has been re-measured to verify it is beyond established specification limits, is repeatable, and is reliable.

OUT OF SERVICE - A device being unavailable due to electrical or mechanical failure of the device itself, or lack of a required support system, (e.g., electrical power or instrument air), or equipment being inaccessible due to nearby activities. This can be due to either planned and/or scheduled outages, unplanned failures, or natural disasters.

1.4 Definitions and Acronyms (Cont.)

Acronyms

CAM - Continuous Air Monitor

DCRT - Double Contained Receiver Tank

DST - Double-Shell Tank

ILL - Interstitial Liquid Level

LOW - Liquid Observation Well

MT - Manual Tape

NA – Not Applicable

OSD - Operating Specifications Document

RCRA - Resource Conservation and Recovery Act

SACS – Surveillance Analysis Computer System

SST - Single-Shell Tank

TMACS – Tank Monitor and Control System

TPA - Tri Party Agreement

TS & DA - Tank Surveillance and Data Acquisition

WDOE – State of Washington Department of Ecology, also referred to as "Ecology"

2.0 SINGLE-SHELL TANK LEAK AND INTRUSION DETECTION SPECIFICATIONS

According to RPP-9937, routine LDM is required if a tank exceeds the maximum remaining liquid volume criteria, and LDM is also technically feasible. If a tank is exempt from LDM requirements it must still be monitored for intrusion. Table 2-3 specifies whether the tank is being monitored for LDM or intrusion, and all tanks in the table are subject to the requirements of this section. The required frequency is determined by the logic outlined in the latest version of RPP-9937.

Monitoring requirements in this OSD are applicable during the waste storage function until the start of retrieval operations, and after completion of retrieval operations. This OSD is not applicable during active retrieval operations or during closure operations. (See definition of "Retrieval Status" in "DEFINITIONS" section of this document.) Monitoring requirements during retrieval operations will be addressed by the tank-specific retrieval documents. Table 2-1 and Table 2-2 list the specification limits for leak and intrusion detection, and Table 2-3 lists the PRIMARY monitoring method for each tank and the applicable frequency. Acceptable pre-approved ALTERNATE measurement devices are given in the Detection/Control section.

SST leak and intrusion detection specification limits are given for each monitoring method. The specification limits for each detection or survey method are applicable only to that specific leak detection or survey method, and only under the conditions specified. WHC-SD-WM-TI-573, Section 4.0 provides the basis for selection of the PRIMARY leak detection or survey methods.

For tanks containing less than 40 thousand gallons of liquid RPP-9937 requires one annual measurement to verify that an intrusion is not occurring, (either a LOW or surface level, depending on equipment installed). One data point per year cannot be analyzed using the normal "baseline and tolerance" trending techniques due to insufficient data. (One reading per year does not provide a statistically valid number of measurements.) Operations management has agreed to obtain the intrusion readings in Table 2-3 quarterly in an effort to identify significant intrusions in a more timely manner.

Table 2-1 Detection Specification Limits

Variable	Specification Limit
Interstitial Liquid Level (ILL) with established trend baseline	+/-3 standard deviations (σ) from trend baseline, or –1.2 inches, whichever is larger
New Interstitial Liquid Level (ILL) without established trend baseline	+/-3.6 inches from the reference baseline
Surface Level Device (ENRAF™, MT, or Zip Cord)	See Table 2-2 (Below)

2.0 SINGLE-SHELL TANK LEAK AND INTRUSION DETECTION SPECIFICATIONS (CONT.)

Table 2-2 Surface Level Device Detection Specification Limits

Device	Assumed Waste Surface				
	Liquid, No Seasonal Variation	Liquid with Seasonal Variation	Partial Liquid	Slurry	Dry
ENRAF	+/-0.5 in.	+/-1.0 in.	+/-1.0 in.	+/-3.0 in.	NA
Manual Tape	+/-1.0 in.	+/-1.0 in.	+/-2.0 in.	+/-3.0 in.	NA
Zip Cord	+/-1.0 in.	+/-1.0 in.	+/-2.0 in.	+/-3.0 in.	NA

For all surface level devices specified as PRIMARY monitoring device in Table 2-3, refer to Table 2-2 above for the Specification Limit. The increase and decrease values listed represent the maximum allowable deviation from the established baseline for that device.

Table 2-3 Single-Shell Tank Monitoring Device and Frequency (4 pages)

Tank	Primary Monitoring Device	Monitoring Frequency	Specification Limit	LDM or Intrusion
A-101	LOW	Quarterly	ILLSL	Intrusion
A-102	Enraf	Quarterly	+3.0 in	Intrusion
A-103	LOW	Quarterly	ILLSL	LDM
A-104	ENRAF	Quarterly	+3.0 in.	Intrusion
A-105	ENRAF	Quarterly	+3.0 in.	Intrusion
A-106	LOW	Quarterly	ILLSL	Intrusion
AX-101	LOW	Quarterly	ILLSL	Intrusion
AX-102	ENRAF	Quarterly	+3.0 in.	Intrusion
AX-103	LOW	Quarterly	ILLSL	Intrusion
AX-104	ENRAF	Quarterly	+3.0 in.	Intrusion
B-101	LOW	Quarterly	ILLSL	Intrusion
B-102	ENRAF	Quarterly	+1.0 in.	Intrusion
B-103	ENRAF	Quarterly	+3.0 in.	Intrusion
B-104	LOW	Quarterly	ILLSL	Intrusion
B-105	LOW	Quarterly	ILLSL	Intrusion
B-106	ENRAF	Quarterly	+3.0 in.	Intrusion
B-107	LOW	Quarterly	ILLSL	Intrusion
B-108	LOW	Quarterly	ILLSL	Intrusion
B-109	LOW	Quarterly	ILLSL	Intrusion
B-110	LOW	Quarterly	ILLSL	Intrusion
B-111	LOW	Quarterly	ILLSL	Intrusion
B-112	ENRAF	Quarterly	+1.0 in.	Intrusion
B-201	ENRAF	Quarterly	+3.0 in.	Intrusion
B-202	ENRAF	Quarterly	+3.0 in.	Intrusion
B-203	ENRAF	Quarterly	+3.0 in.	Intrusion
B-204	ENRAF	Quarterly	+3.0 in.	Intrusion
BX-101	ENRAF	Quarterly	+1.0 in.	Intrusion
BX-102	ENRAF	Quarterly	+3.0 in.	Intrusion
BX-103	ENRAF	Quarterly	-1.0 in.	LDM

Tank	Primary Monitoring Device	Monitoring Frequency	Specification Limit	LDM or Intrusion
BX-104	ENRAF	Quarterly	+3.0 in.	Intrusion
BX-105	ENRAF	Quarterly	+3.0 in.	Intrusion
BX-106	ENRAF	Quarterly	+3.0 in.	Intrusion
BX-107	ENRAF	Quarterly	+1.0 in.	Intrusion
BX-108	ENRAF	Quarterly	+3.0 in.	Intrusion
BX-109	LOW	Quarterly	ILLSL	Intrusion
BX-110	LOW	Quarterly	ILLSL	Intrusion
BX-111	LOW	Quarterly	ILLSL	Intrusion
BX-112	ENRAF	Quarterly	+3.0 in.	Intrusion
BY-101	LOW	Quarterly	ILLSL	Intrusion
BY-102	LOW	Quarterly	ILLSL	Intrusion
BY-103	LOW	Quarterly	ILLSL	LDM
BY-104	LOW	Quarterly	ILLSL	Intrusion
BY-105	LOW	Quarterly	ILLSL	Intrusion
BY-106	LOW	Quarterly	ILLSL	Intrusion
BY-107	LOW	Quarterly	ILLSL	Intrusion
BY-108	LOW	Quarterly	ILLSL	Intrusion
BY-109	LOW	Quarterly	ILLSL	Intrusion
BY-110	LOW	Quarterly	ILLSL	Intrusion
BY-111	LOW	Quarterly	ILLSL	Intrusion
BY-112	LOW	Quarterly	ILLSL	Intrusion
C-101	ENRAF	Quarterly	+3.0 in.	Intrusion
C-102	ENRAF	Quarterly	-3.0 in.	LDM
C103	ENRAF	Quarterly	+3.0 in.	Intrusion
C-104	ENRAF	Quarterly	+3.0 in.	Intrusion
C-105	ENRAF	Quarterly	+3.0 in.	Intrusion
C-106	ENRAF	Quarterly	+3.0 in.	Intrusion
C-107	ENRAF	Quarterly	+3.0 in.	Intrusion
C-108	ENRAF	Quarterly	+3.0 in.	Intrusion
C-109	ENRAF	Quarterly	+3.0 in.	Intrusion
C-110	ENRAF	Quarterly	+3.0 in.	Intrusion
C-111	ENRAF	Quarterly	+3.0 in.	Intrusion
C-112	ENRAF	Quarterly	+3.0 in.	Intrusion
C-201	ENRAF	Quarterly	+3.0 in.	Intrusion
C-202	ENRAF	Quarterly	+3.0 in.	Intrusion
C-203	ENRAF	Quarterly	+3.0 in.	Intrusion
C-204	ENRAF	Quarterly	+3.0 in.	Intrusion
S-101	LOW	Quarterly	ILLSL	Intrusion
S-102	ENRAF	Quarterly	+3.0 in.	Intrusion
S-103	LOW	Quarterly	ILLSL	Intrusion
S-104	LOW	Quarterly	ILLSL	Intrusion
S-105	LOW	Quarterly	ILLSL	Intrusion
S-106	LOW	Quarterly	ILLSL	Intrusion
S-107	LOW	Quarterly	ILLSL	Intrusion
S-108	LOW	Quarterly	ILLSL	Intrusion
S-109	LOW	Quarterly	ILLSL	Intrusion
S-110	LOW	Quarterly	ILLSL	Intrusion
S-111	LOW	Quarterly	ILLSL	Intrusion
S-112	ENRAF	Quarterly	+3.0 in.	Intrusion
SX-101	LOW	Quarterly	ILLSL	Intrusion
SX-102	LOW	Quarterly	ILLSL	Intrusion
SX-103	LOW	Quarterly	ILLSL	Intrusion
SX-104	LOW	Quarterly	ILLSL	Intrusion

Tank	Primary Monitoring Device	Monitoring Frequency	Specification Limit	LDM or Intrusion
SX-105	LOW	Quarterly	ILLSL	Intrusion
SX-106	LOW	Quarterly	ILLSL	Intrusion
SX-107	ENRAF	Quarterly	+3.0 in.	Intrusion
SX-108	ENRAF	Quarterly	+3.0 in.	Intrusion
SX-109	ENRAF	Quarterly	+3.0 in.	Intrusion
SX-110	ENRAF	Quarterly	+3.0 in.	Intrusion
SX-111	LOW	Quarterly	ILLSL	Intrusion
SX-112	LOW	Quarterly	ILLSL	Intrusion
SX-113	ENRAF	Quarterly	+3.0 in.	Intrusion
SX-114	ENRAF	Quarterly	+3.0 in.	Intrusion
SX-115	ENRAF	Quarterly	+3.0 in.	Intrusion
T-101	LOW	Quarterly	ILLSL	Intrusion
T-102	ENRAF	Quarterly	-1.0 in.	LDM
T-103	ENRAF	Quarterly	+3.0 in.	Intrusion
T-104	LOW	Quarterly	ILLSL	Intrusion
T-105	ENRAF	Quarterly	+3.0 in.	Intrusion
T-106	ENRAF	Quarterly	+3.0 in.	Intrusion
T-107	ENRAF	Quarterly	+1.0 in.	Intrusion
T-108	ENRAF	Quarterly	+1.0 in.	Intrusion
T-109	LOW	Quarterly	ILLSL	Intrusion
T-110	LOW	Quarterly	ILLSL	Intrusion
T-111	LOW	Quarterly	ILLSL	Intrusion
T-112	ENRAF	Quarterly	-1.0 in.	LDM
T-201	ENRAF	Quarterly	+1.0 in.	Intrusion
T-202	ENRAF	Quarterly	+1.0 in.	Intrusion
T-203	ENRAF	Quarterly	+3.0 in.	Intrusion
T-204	ENRAF	Quarterly	+1.0 in.	Intrusion
TX-101	ENRAF	Quarterly	+1.0 in.	Intrusion
TX-102	LOW	Quarterly	ILLSL	Intrusion
TX-103	LOW	Quarterly	ILLSL	Intrusion
TX-104	LOW	Quarterly	ILLSL	Intrusion
TX-105	LOW	Quarterly	ILLSL	Intrusion
TX-106	LOW	Quarterly	ILLSL	Intrusion
TX-107	ENRAF	Quarterly	+3.0 in.	Intrusion
TX-108	ENRAF	Quarterly	+3.0 in.	Intrusion
TX-109	LOW	Quarterly	ILLSL	Intrusion
TX-110	LOW	Quarterly	ILLSL	Intrusion
TX-111	LOW	Quarterly	ILLSL	Intrusion
TX-112	LOW	Quarterly	ILLSL	Intrusion
TX-113	LOW	Quarterly	ILLSL	Intrusion
TX-114	LOW	Quarterly	ILLSL	Intrusion
TX-115	LOW	Quarterly	ILLSL	Intrusion
TX-116	LOW	Quarterly	ILLSL	Intrusion
TX-117	LOW	Quarterly	ILLSL	Intrusion
TX-118	LOW	Quarterly	ILLSL	Intrusion
TY-101	ENRAF	Quarterly	+3.0 in.	Intrusion
TY-102	ENRAF	Quarterly	+1.0 in.	Intrusion
TY-103	LOW	Quarterly	ILLSL	Intrusion
TY-104	ENRAF	Quarterly	+1.0 in.	Intrusion
TY-105	LOW	Quarterly	ILLSL	Intrusion
TY-106	ENRAF	Quarterly	+3.0 in.	Intrusion
U-101	ENRAF	Quarterly	+1.0 in.	Intrusion
U-102	LOW	Quarterly	ILLSL	Intrusion

Tank	Primary Monitoring Device	Monitoring Frequency	Specification Limit	LDM or Intrusion
U-103	LOW	Quarterly	ILLSL	Intrusion
U-104	ENRAF	Quarterly	+3.0 in.	Intrusion
U-105	LOW	Quarterly	ILLSL	Intrusion
U-106	LOW	Quarterly	ILLSL	Intrusion
U-107	LOW	Quarterly	ILLSL	Intrusion
U-108	LOW	Quarterly	ILLSL	Intrusion
U-109	LOW	Quarterly	ILLSL	Intrusion
U-110	LOW	Quarterly	ILLSL	Intrusion
U-111	LOW	Quarterly	ILLSL	Intrusion
U-112	MT	Quarterly	+3.0 in.	Intrusion
U-201	MT	Quarterly	+2.0 in.	Intrusion
U-202	MT	Quarterly	+2.0 in.	Intrusion
U-203	ENRAF	Quarterly	+3.0 in.	Intrusion
U-204	ENRAF	Quarterly	+1.0 in.	Intrusion

Legend for Table 2-3

1. Primary Leak and Intrusion Detection

   LOW – Liquid Observation Well
   ENRAF – ENRAF™ displacer-type surface level gauge
   MT – Manual Tape

2. ILLSL - Interstitial Liquid Level Specification Limit

3. A tank may change monitoring status due to saltwell pumping, transfer, retrieval operations, or closure operations. This may lead to a situation where the device and frequency specified in Table 2-3 are no longer applicable. The new tank status will be evaluated based on the requirements in RPP-9937, and the resulting monitoring requirements shall be implemented as soon as practical. This OSD will be updated regularly to reflect tank status changes.

2.0 SINGLE-SHELL TANK LEAK AND INTRUSION DETECTION SPECIFICATIONS (CONT.)

Technical Basis: According to RPP-9937, two key considerations dictate whether or not a tank requires Leak Detection Monitoring (LDM). First, is LDM technically feasible, i.e., can a leak be monitored with currently available instrumentation? Second, does the tank meet Interim Stabilization (IS) criteria? The IS criteria are less than 50 kgal total drainable liquid, and less than 5 kgal supernatant. Any tank that is technically capable of LDM which fails to meet the IS criteria is required to be monitored for leaks (LDM). Additionally, if a tank meets the IS criteria, but has not completed intrusion prevention (IP), and has 40 kgal or more of total drainable liquid there is a risk that it may exceed the 50 kgal criteria if there is an intrusion. These tanks require weekly monitoring for intrusion.

To determine if leak detection monitoring (LDM) is technically feasible or not the following logic is used. If a waste surface is fluid enough to register a decrease in response to a leak, (either liquid, partial liquid, or slurry surface), then the surface level gauge can be used to detect a leak and is the preferred device. If the surface is dry or solid and would not decrease in response to a leak, then the only leak detection available is the LOW. A LOW can be installed and effectively monitor for a leak if there is more than 24 inches of total waste and greater than 5 kgal of total drainable liquid. Tanks meeting this criteria already have a LOW installed. If the tank has a dry surface and a LOW is not feasible based on the criteria just cited, no leak detection capability is claimed, and RPP-9937 only requires intrusion monitoring. See WHC-SD-WM-TI-573, RPP-9645, and RPP-9937 for expanded discussions.

Derivation of the specification limits, their application to each type of baseline, monitoring frequencies and additional information on their technical basis can be found in WHC-SD-WM-TI-573.

Detection/Control: Table 2-3 lists the PRIMARY means of leak and intrusion detection for each SST, and the required monitoring frequency and specification limit. Pre-approved ALTERNATE devices for surface level measurement are ENRAF, FIC, Manual Tape, Zip Cord, and Weight Factor. Pre-approved ALTERNATE devices for a LOW include weight factor readings taken in the saltwell screen and surface level devices in a stilling well or flooded LOW. Additional ALTERNATE devices not specifically mentioned above can be used if they are approved by a letter from the System Engineering Manager.

For surface level measurements, whether a tank is assumed to have a liquid, partial liquid, slurry, or dry surface is determined by the surveillance lead engineer in the System Engineering group. Tanks exhibiting significant seasonal level reading variations are determined by the surveillance lead engineer in the System Engineering group.

Baselines are prepared and approved following the guidelines in TFC-ENG-CHEM-D-19. Reference baselines, trend baselines, and all temporary zip cord, dip tube or other baselines are established by the System Engineering group. The permissible surface level increase and decrease values (whether based on standard deviation or a fixed value) are determined from Table 2-2 and incorporated into the Surveillance Analysis Computer System (SACS), Tank

2.0 SINGLE-SHELL TANK LEAK AND INTRUSION DETECTION SPECIFICATIONS (CONT.)

Monitoring and Control System (TMACS) and/or appropriate round sheets, data sheets or other approved documentation.

Surface level data is gathered in accordance with procedures TO-040-180, applicable round sheets or other approved documentation. Scans of LOWs are acquired in accordance with procedure TO-040-333, or other approved documentation. Data from dip tube or zip cord measurements are recorded on round sheets, data sheets or other approved documentation as directed by the Base Operations Shift Manager. System Engineering personnel analyze the data for compliance to the frequency requirements and specification limits contained in this document.

Specification limits given in Table 2-2 DO NOT apply to ALTERNATE devices as long as the PRIMARY device is operational. Specification limits DO apply to any ALTERNATE device that is used in place of a PRIMARY device.

The remaining Manual Tape gauges are in the process of being replaced with a displacer-type gauge manufactured by the ENRAF Corporation. ENRAF displacer-type level gauges may be substituted for Manual Tapes whenever they are used as PRIMARY or ALTERNATE leak detection devices. The limit specified in Table 2-2 is applied for whichever device is being used.

Each LOW will have a probe type designated as "primary". All other probe types are considered "secondary". The specification limit always applies to the primary probe. The specification limit will not be applied to the secondary probe unless a valid baseline has been established for that probe.

Recovery Action: The section below describes what does and does not constitute an OSD violation. It also describes actions to be taken if specified monitoring equipment is out-of-service. If the actions specified are taken within the allowable time period, no OSD violation will occur.

WARNING -With the acceptance of RPP-9937 as a primary TPA document the consequences of an OSD violation have increased significantly. Failure to obtain data specified in this OSD may also violate TPA requirements. Also, the frequency definitions have been altered to eliminate the previous grace periods. RPP-9937 does not allow for time extensions.

Obtaining or reporting data that exceeds a specification limit for a liquid level or LOW reading is not an OSD violation. Both surface level and Interstitial Liquid Level (ILL) measurements can be subject to substantial deviations due to changes in barometric pressure. In the case of a significant barometric response, raw data should be corrected for barometric effects prior to determining whether or not a measurement has exceeded a specification limit. For all verified corrected data that exceeds the specification limits established in this document, the process outlined in TFC-CHEM-D-42, "Tank Leak Assessment Process" shall be followed.

2.0 SINGLE-SHELL TANK LEAK AND INTRUSION DETECTION SPECIFICATIONS (CONT.)

Deferral of required readings for up to 72 hours is permitted when the safety of personnel or performance of equipment will be adversely affected by weather or other conditions. (Examples: heavy snow fall or dust storms severe enough to compromise safety.) The deferral of required data is to be documented on a Problem Evaluation Request (PER). No additional deferral is allowed until a valid reading has been obtained.

If a required reading is not obtained for any reason other than the 72-hour personnel safety deferral, a PER (TUF) shall be issued within 4 working days of the required frequency being exceeded. The PER shall include a corrective plan developed with the concurrence of the System Engineering Manager, the appropriate Base Operations Manager, and the Environmental Support and Assessment Program Manager. This corrective plan shall contain a commitment date for resolving the problem and completing all actions required to be in full compliance with the OSD. Ecology shall be notified per the requirements in TFC-ENG-ENV_FS-C-01, "Environmental Notifications". Missing a required reading and committing to a corrective plan is not an OSD violation. If the commitment date in the corrective plan is exceeded without achieving OSD compliance, an OSD violation will occur.

If an OSD violation occurs, Operations Management shall issue a new PER declaring the violation within one working day. The appropriate recovery shall be determined by the PER assignee and the recovery actions documented in the PER resolution. Ecology shall be notified per the requirements in TFC-ENG-ENV_FS-C-01, "Environmental Notifications" and an Occurrence Report shall be issued if required by TFC-OPS-OPER-C-24, "Occurrence Reporting and Processing of Operations Information".

3.0 DOUBLE-SHELL TANK LEAK DETECTION SPECIFICATIONS

The technical basis for leak detection in the double-shell tank (DST) system is significantly different from that of the SST system. The annular space between the two shells is continuously monitored, and the presence of liquid or radionuclides in this space is considered evidence of a possible primary tank leak. Conductivity probes or ENRAF gauges are used to monitor for unexpected liquid increases, while the Annulus Continuous Air Monitor (CAM) can also used to monitor for airborne radionuclides. All 28 Hanford DSTs are subject to the requirements of this section.

The environmental leak detection requirements imposed by the State of Washington Department of Ecology, (Ecology), and those imposed by the Safety Basis (SB) are significantly different. If the SB requirements are being met it does not necessarily follow that the Ecology requirements are also being met. It is critical that both sets of requirements be fully understood and complied with.

Per the Settlement Agreement and Stipulated Order of Dismissal, (U.S. Department of Energy, et al. v. Ecology, PCHB No. 98-249; PCHB No. 98-250), referred to as "Settlement Agreement", each DST on the Hanford Site will be equipped and operated with a complete continuous Leak Detection System by December 31, 1999. A continuous Leak Detection System for each of the twenty eight (28) DSTs on the Hanford site shall be composed of three (3) operating annulus leak detector probes and at least one in-tank surface level monitor installed within the primary tank. The annulus leak detector probes shall be placed as equidistantly as possible within the annulus of each DST. Each adjustable annulus leak detector probe shall be set within 1/4 inch from the annulus floor with allowance for normal engineering tolerances. An annulus leak detector probe shall be a conductivity type probe, or equal or better device, (such as an ENRAF).

The Leak Detection System on each DST may not be replaced by, but may be supplemented by, the operation of an annulus ventilation system Continuous Air Monitor (CAM).

These requirements are summarized in Table 3-1 and Table 3-2.

3.0 DOUBLE-SHELL TANK LEAK DETECTION SPECIFICATIONS (CONT.)

Table 3-1 Required Leak Detection System (Ecology)

Variable	Category	Specification Limit
Three (3) Annulus Conductivity Probes (ENRAF gauges in the annulus may be substituted)	All DSTs	All annulus variable height conductivity probes shall be set at 0.25 inches from the annulus bottom, with a tolerance of +/- 0.25 inches. (Full range equals 0.00 to 0.50 inches). * ENRAF gauges shall be set to alarm at 0.25 inches of liquid buildup and shall be monitored daily. All unplanned annulus conductivity alarms or evidence of unexpected liquid in an annulus shall be investigated.
At least one (1) in-tank surface level monitor within the primary tank. (ENRAF, FIC, MT, or equivalent. Zip cord may be substituted in case of failure)	All DSTs	Surface level will be monitored daily

* See the Technical Basis Document, WHC-SD-TI-573, sections 6.1.1.1 and 6.2.2.3 for a discussion of the conductivity probe tolerance.

If the annulus ventilation system is being operated and the annulus CAM is operational, Table 3-2 (below) shall apply.

Table 3-2 Supplement to Leak Detection System (Ecology)

Variable	Category	Specification Limit
Annulus CAM Radiation Level	All DSTs	Filter papers removed from an annulus CAM following a verified alarm shall be counted for long-life radionuclides. (Non-Radon) When the annulus vent system is operating, all DSTs equipped with operating annulus CAMs will be monitored daily for airborne releases into the annulus that could give an indication of a leak from the primary tank structure into the annulus. CAMs will be set to alarm at set points no greater than 3,000 counts per minute.

3.0 DOUBLE-SHELL TANK LEAK DETECTION SPECIFICATIONS (CONT.)

Technical Basis: The annulus conductivity probes respond to the presence of conductive liquid between the electrode and the annulus liner. The conductivity probe tolerance is discussed in Sections 6.1.1.1 and 6.2.2.3 of WHC-SD-WM-TI-573. In AP, AY, AZ, and SY farms ENRAF gauges monitor for liquid buildup in the annulus. The annulus conductivity probes in AN and AW farms are also being replaced with ENRAF gauges. The presence of long-life radionuclides on the CAM filter paper is also an indication of potential primary tank leakage. The in-tank surface level gauge monitors the surface level in the primary tank.

Most of the specification limits in Tables 3-1 and Table 3-2 were derived directly from requirements contained in the Settlement Agreement. Since this was a legal directive, compliance is mandatory regardless of any supporting technical basis.

Detection/Control: Monitoring of annulus conductivity probe settings and annulus CAM operation and alarm response are described in procedure TO-040-590. Unexpected leak detection conductivity alarms will initiate an investigation by the Waste Feed Operations Shift Manager.

Radiation recorder readings from operating annulus CAMs are entered on routine tank farm data sheets.

Alarm setpoints for operating annulus CAMs are normally set by Radiological Protection personnel, and shall be set no greater than 3000 counts per minute. When a CAM alarms, the required response is provided in TO-040-590.

SETTLEMENT AGREEMENT REQUIREMENTS:

Per the requirements of the Settlement Agreement, all Leak Detection System devices comprising the Leak Detection System shall be maintained and operated continuously with the following exceptions:

1. Downtime for preventive maintenance and periodic functional testing shall not exceed twenty-four (24) hours.

2. Downtime for repair of a Leak Detection System device discovered to be inoperable or requiring repair shall not normally exceed ninety (90) days. Ecology must be notified of any leak detection device out-of-service for more than ninety (90) days.

3. All maintenance, repair, and functional testing activities of the Leak Detection System shall be documented in Hanford's operating record.

In the case of a planned facility shutdown, which will render the Leak Detection System inoperable for any period greater than 24 hours, Ecology must be notified. Any alternate leak detection requirements to be implemented during the outage must be documented in a letter from the Environmental Support and Assessment Program Manager to the Base Operations Director.

3.0 DOUBLE-SHELL TANK LEAK DETECTION SPECIFICATIONS (CONT.)

DSA REQUIREMENTS:

The DSA does not specify a required frequency for primary tank waste level monitoring.

HNF-SD-WM-TSR-006, LCO 3.5 states that, "The DST annulus waste level shall be ≤ 15 in.", and is applicable to all DST's at all times.

HNF-SD-WM-TSR-006, SR 3.5.1 states that the operator must, "VERIFY the DST annulus waste level is ≤ 15 in." at a frequency of 5 days

3.0 DOUBLE-SHELL TANK LEAK DETECTION SPECIFICATIONS (CONT.)

Recovery Action: Failure to obtain a reading within the specified frequency is permitted when the safety of personnel or performance of equipment will be adversely affected by weather or other conditions. (Examples: heavy snow fall or dust storms severe enough to compromise safety.) The deferral of required data is to be documented on a Problem Evaluation Request (PER), and is valid for a maximum of 72 hours from the time the specified frequency was exceeded. No additional deferral is allowed until a valid reading has been obtained. If data collection will be deferred more than 24 hours the Environmental Support and Assessment Program Manager must also notify Ecology.

If the leak detection devices required for compliance with the Safety Basis and the Settlement Agreement are functional, failure to obtain a valid reading within the required frequency is an OSD violation.

Recording and investigating a leak detector alarm, an abnormal surface level change, or an annulus CAM alarm is not an OSD violation. Failure to collect the required data or investigate an alarm is an OSD violation. For all data that exceeds the specification limits established in this document, the process outlined in TFC-ENG-CHEM-D-42, "Tank Leak Assessment Process" shall be followed.

If an OSD violation occurs, Operations Management shall issue a PER within one working day of the violation. The appropriate recovery shall be determined by the PER assignee and the recovery actions documented in the PER resolution. Ecology shall be notified per the requirements in TFC-ENG-ENV_FS-C-01, "Environmental Notifications" and an Occurrence Report shall be issued if required by TFC-OPS-OPER-C-24, "Occurrence Reporting and Processing of Operations Information".

4.0 LEAK AND INTRUSION DETECTION SPECIFICATIONS FOR CATCH TANKS AND MISCELLANEOUS VESSELS

There are three basic types of catch tanks. The first is a single tank with no vault or secondary containment. The second type is a primary tank within a vault or secondary containment. The third type is a Double Contained Receiver Tank (DCRT), which was typically used to support waste transfers prior to being taken out of service. It consists of a primary tank within a cement vault, but also has additional instrumentation and active ventilation to support waste transfers. This section addresses leak detection and intrusion detection requirements for all three types of tank.

All catch tanks and miscellaneous vessels associated with the SST system are subject to the TPA requirements contained in RPP-9937. This Functions and Requirements document sorts the SST catch tanks based on whether they are in use or not, whether they meet the Interim Stabilization criteria of less than 400 gallons, and whether they have been isolated or not. The result of this decision tree analysis yields either a quarterly monitoring requirement, (if LDM is indicated), or an annual monitoring requirement, (if only intrusion monitoring is required). RPP-9937 does not address catch tanks in the DST system, so the existing daily monitoring requirement is still in effect for AZ-301. Table 4-1 addresses all catch tank leak detection monitoring requirements.

A measurement at the frequency specified is required for each tank listed in Table 4-1 from EITHER the primary tank level device (available in every tank), OR the secondary containment monitoring device (where available). Both leak detection measurements are considered equivalent for OSD compliance purposes.

The leak detection specification limit for secondary containment depends on the monitoring device available, and can be obtained from Table 2-2.

The leak detection specification limit in the primary tank is based on the installed instrument and the stability of the tank. Refer to Table 2-2 for applicable values. The appropriate limit can be referenced to either the established baseline, or the most recent data trend (trend analysis). Trend analysis consists of monitoring for a decrease from the trend established by previous readings. In general, tanks with very stable levels have baselines assigned and are subject to a fixed decrease criteria that is dependent on the accuracy of the instrumentation and stability of the tank. Tanks that change significantly on a regular basis, such that maintaining a valid baseline is impractical, are evaluated using trend analysis. Trend analysis compares the most recent value with the previous data trend and looks for a change that exceeds the specification limit. See the Technical Basis section for further discussion of the trend analysis process.

4.0 LEAK AND INTRUSION DETECTION SPECIFICATIONS FOR CATCH TANKS AND MISCELLANEOUS VESSELS (CONT.)

Table 4-1 Catch Tank and Miscellaneous Tank Monitoring

Tank	Primary Tank Level Device	Secondary Containment Device	Required Frequency	Primary Tank Specification Limit	Secondary Containment Specification Limit
240-S-302	ENRAF	None	Quarterly	-0.5 in. from BL	None
244-A	Weight Factor	Weight Factor	Quarterly	Trend Analysis	+1.0 in. from BL
244-AR, TK-001	Weight Factor	NA	Quarterly	+1.0 in. from BL	NA
244-AR, Cell 1	NA	Weight Factor	Quarterly	NA	+1.0 in. from BL
244-AR, TK-002	Weight Factor	NA	Quarterly	+1.0 in. from BL	NA
244-AR, Cell 2	NA	Weight Factor	Quarterly	NA	+1.0 in. from BL
244-AR, TK-003	Weight Factor	NA	Quarterly	+1.0 in. from BL	NA
244-AR, TK-004	Weight Factor	NA	Quarterly	+1.0 in. from BL	NA
244-AR, Cell 3	NA	Weight Factor	Quarterly	NA	+1.0 in. from BL
244-BX	Manual Tape	Manual Tape	Quarterly	Trend Analysis	+1.0 in. from BL
244-CR-003	Zip Cord	None	Quarterly	+/- 1.0 in. from BL	None
244-S	Weight Factor	Weight Factor	Quarterly	Trend Analysis	+1.0 in. from BL
244-TX	Enraf	Manual Tape	Quarterly	+/- 1.0 in. from BL	+1.0 in. from BL
311-ER	ENRAF	None	Quarterly	+0.5 in. from BL	None
A-302-A	ENRAF	None	Quarterly	-0.5 in. from BL	None
A-302-B	Manual Tape	None	Quarterly	-1.0 in. from BL	None
A-350	Weight Factor	Conductivity Alarm	Quarterly	Trend Analysis	Verify Alarm Status
A-417	Weight Factor	NA	Quarterly	+1.0 in. from BL	NA
AX-152	Manual Tape	None	Quarterly	+1.0 in. from BL	None
AZ-151	ENRAF	None	Quarterly	Trend Analysis	None
AZ-154	Zip Cord	None	Quarterly	+1.0 in. from BL	None
AZ-301	ENRAF	None	Daily	Trend Analysis	None
E/W Vent Station	Manual Tape	None	Quarterly	Trend Analysis	None
S-304	ENRAF	NA	Quarterly	+0.5 in. from BL	NA
TX-302-B	ENRAF	None	Quarterly	-0.5 in. from BL	None
TX-302-C	ENRAF	NA	Quarterly	+0.5 in. from BL	NA
U-301-B	ENRAF	None	Quarterly	-0.5 in. from BL	None
UX-302-A	ENRAF	None	Quarterly	+0.5 in. from BL	None

4.0 LEAK AND INTRUSION DETECTION SPECIFICATIONS FOR CATCH TANKS AND MISCELLANEOUS VESSELS (CONT.)

Technical Basis: For a single tank with no vault or secondary containment leak and intrusion detection normally consists of level measurements in the primary tank, looking for increases or decreases from the data trend or baseline. For a primary tank within a vault or secondary containment, leak detection can be accomplished by either monitoring for unexpected liquid increase in the secondary containment, (typically a low-point sump), or decreasing level in the primary tank. Intrusions are identified by unexpected level increases in either the primary tank or surrounding vault. An increasing level in the surrounding vault can be due to either an intrusion into the vault or a leak from the primary tank. In either case the anomalous data triggers an investigation, and the source of the increase is identified. For a DCRT, leak detection is accomplished by monitoring either the vault sump for liquid increases or the primary tank for unexpected decreases.

Some catch tanks are very stable, and surface levels rarely change. These tanks can be monitored using a fixed baseline and the appropriate increase/decrease criteria from Table 2-2. AZ301 collects process condensate daily, and rises continuously until it becomes full and is pumped empty again. The constant level changes make establishing and maintaining a fixed baseline impractical. Leak and intrusion detection is accomplished in these cases by observing for level changes deviating from the most recent data trend. In Table 4-1 this is referred to as "Trend Analysis". In essence, the baseline is continuously adjusted based on the most recent trend and the appropriate specification limit is then applied. Other tanks collect random transfer fluids and rainwater, and the surface level response is erratic. Even though the increases are unpredictable, the level should not decrease significantly unless the tank is being pumped. These tanks also use "Trend Analysis", and are monitored for decreases from recent data without an established baseline.

In tanks with secondary containment, the liquid level in the sump is monitored for unexpected increases. Any increase that exceeds the specification limit is investigated as a potential leak from the primary tank or an intrusion into the containment vessel. A conductivity alarm may also be used to identify the presence of unexpected liquid in the sump.

If a catch tank associated with the SST system is no longer active and is below the interim stabilization criteria of 400 gallons, then RPP-9937 does not require leak detection monitoring (LDM). The only TPA requirement is an annual check to verify that no intrusions are occurring. As with SST intrusion detection, Operations Management has agreed to collect this data quarterly to allow a statistically valid number of samples and improved response time.

Existing level instruments may be upgraded to Enrafs at any time. When the Enraf is used either Trend Analysis or the appropriate Specification Limit from Table 2-2 shall be applied. This OSD shall be updated to reflect new instrument installations as soon as practical.

Level-to-Volume conversion tables for the catch tanks can be located in RPP-11866, Appendix A. Refer to WHC-SD-WM-TI-573, RPP-9937, and RPP-11866 for an expanded discussion.

4.0 LEAK AND INTRUSION DETECTION SPECIFICATIONS FOR CATCH TANKS AND MISCELLANEOUS VESSELS (CONT.)

Detection/Control: Tables 4-1 lists the current level measurement device for the primary tank and secondary containment of each catch tank or vessel, the required monitoring frequency, and applicable specification limits for both systems.

Pre-approved ALTERNATE devices for surface level measurements are ENRAF, FIC, Manual Tape, Zip Cord, and Weight Factor. A conductivity-type leak detection alarm may also be used to monitor for the presence of unexpected liquid in the secondary containment.

Recovery Action: The section below describes what does and does not constitute an OSD violation. It also describes actions to be taken if specified monitoring equipment is out-of-service. If the actions specified are taken within the allowable time period, no OSD violation will occur.

Obtaining or reporting data that exceeds a specification limit for either a primary tank or secondary containment monitoring device is not an OSD violation. For all data that exceeds the specification limits established in this document, the process outlined in TFC-ENG-CHEM-D-42, "Tank Leak Assessment Process" shall be followed.

Deferral of required readings for up to 72 hours is permitted when the safety of personnel or performance of equipment will be adversely affected by weather or other conditions. (Examples: heavy snow fall or dust storms severe enough to compromise safety.) The deferral of required data is to be documented on a Problem Evaluation Request (PER). No additional deferral is allowed until a valid reading has been obtained.

If a required reading is not obtained for any reason other than the 72-hour personnel safety deferral, a PER (TUF) shall be issued within 4 working days of the required frequency being exceeded. The PER shall include a corrective plan developed with the concurrence of the System Engineering Manager, the appropriate Base Operations Manager, and the Environmental Support and Assessment Program Manager. This corrective plan shall contain a commitment date for resolving the problem and completing all actions required to be in full compliance with the OSD. Ecology shall be notified per the requirements in TFC-ENG-ENV_FS-C-01, "Environmental Notifications". Missing a required reading and committing to a corrective plan is not an OSD violation. If the commitment date in the corrective plan is exceeded without achieving OSD compliance, an OSD violation will occur.

If an OSD violation occurs, Operations Management shall issue a new PER declaring the violation within one working day. The appropriate recovery shall be determined by the PER assignee and the recovery actions documented in the PER resolution. Ecology shall be notified per the requirements in TFC-ENG-ENV_FS-C-01, "Environmental Notifications" and an Occurrence Report shall be issued if required by TFC-OPS-OPER-C-24, "Occurrence Reporting and Processing of Operations Information".